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Dear Readers,

The first quarter of 2020 has mainly been shaped by the outbreak of the new SARS-CoV-2, and the disease Covid-19. With a slow start, is quickly became omnipresent in our lives. By now, almost every country reports infected people.

In Germany, for example, changes happened fast in the last two weeks. At MVW, we continue to work in our office, complying to strict safety and health measures. As important bridgehead for the new silk road, the city of Duisburg is taking precautions regarding the cargo deliveries from China.

While this is a challenging period in every aspect of our lives, it is also a chance to stand together. Fear and panic do not serve any purpose and are simply inappropriate. The same accounts for "panic buying" several packs of toilet paper, flour and pasta – I am astonished what some assume they would consume in a 2-week quarantine while grocery stores remain open. It would even be funny, if it would not elicit a circle of further hoarding.

What we should do is to remain calm but careful, and listen to, and only to, recommendations by officials such as our governments, the WHO and national disease surveillance institutes. Our common goal remains to "**flatten the curve**".

Aside from the personal impact of the virus, it will also affect different aspects of the alternative fuels' and cement industry. A stagnant economy and global supply shortages will most likely have an effect on the cement industry. Closed borders might furthermore impact the global trade with wastes and alternative fuels.

Other consequences might include staff shortages, a decrease in demand for cement and thus alternative fuels, and issues regarding CO_2 emissions trading schemes. We consider different factors on page 4.

But as of now, I can only speculate on future developments. First and foremost, I am confident that most of us think and act reasonably.

Meanwhile, we gladly provide you with the newest edition of the Co-Processing Magazine. While we closely monitor the situation to draw informed conclusions for this year's symposium, we proudly announce the "Alternative Fuel Award" Competition 2020. On page 13 you will read more on how to apply, and the project description of 3rd winner 2019, PSCL, introducing their Waste Fuels Information Management System for Geocycle.

We have furthermore included an overview of the European RDF market on page 5, as well as an exclusive abbreviated and updated excerpt from the Alternative Fuels and Raw Materials Handbook on conveying, starting on page 7.

For news from the first quarter of 2020, move to page 19.

Enjoy reading this booklet, and most importantly: stay safe, stay kind, stay informed about Covid-19.

Yours sincerely,
Dirk Lechtenberg

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VOLUME 2

Compilation of alternative fuels and raw materials fact sheets including among others:

- Information about origin, composition and availability
- Chemical and physical parameters
- Specific influences on the clinker production process
- Environmental aspects

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How Covid-19 Might Affect the Industry

Figure 1: *Staff member ties up bag containing medical waste in southwest China's Chongqing, Source: https://today.line.me/*

The impact the novel disease Covid-19 has on our personal lives is immense. Especially in the past three weeks, limitations in connection with the virus happened almost daily, and what seemed unimaginable at the end of February is our reality now: curfews and hoarders.

However, in most affected countries people act reasonably and to their best to "flatten the curve". There are heart-warming examples of altruism to be found everywhere, even in crisis-ridden Italy. In our industry, for example, HeidelbergCement and its subsidiary Italcimenti recently donated to the Ospedale Papa Giovanni XXIII hospital in Bergamo, to help fight the Virus. Most companies practice "social distancing" by allowing their employees remote work as much as possible and introducing higher safety and health standards at their facilities.

But aside from the personal impact we all experience, what effects might the virus have on the cement and the alternative fuels industry? There are several factors we can already see to have an impact on the industry.

In the mid-term, the most obvious assumption is a decrease in cement demand worldwide. Infrastructure and building projects will be halted, and it is questionable how the financing of these projects will continue after the crisis, taking the rising costs for medical care and economic stabilization into account. In the private sector, we will have to see whether the recession and uncertainty could decrease the willingness to buy and build.

HeidelbergCement actually wanted to increase profits and sales in 2020 - but now there is no forecast for the current year due to the corona crisis. A message that was not well received by investors and analysts. HeidelbergCement's stock price currently reaches a 52-week low.

The decrease in demand will most likely directly impact the implementation and use of alternative fuels. Less profit from lower sales could mean a decrease in investments in co-processing. This effect might be reinforced by the low oil prices of around $30 per barrel and coal prices of $60 per ton we currently see.

Additionally, emission reductions from shutdowns could cause CO_2 prices to drop, which would again lead to lower incentives for alternative fuels implementation. No cement plant in developing countries will be motivated to switch for economic reasons with these prices, especially without gate fees for wastes.

At the same time, we might see supply shortages for alternative fuels and raw materials. With regard to the availability in industrial wastes, we can foresee a drastic reduction in the near future. Industrial enterprises, such car manufacturers, scale down their production, leading to less waste.

Furthermore, cross-national RDF trade will most likely be impaired. On the one hand, we can expect a bottleneck in truck freight traffic; just have a look at the German Polish border with peak crossing times of 30 hours. On the other hand, restrictions in RDF transport are to be expected. The lack of knowledge around the virus' viability on surfaces or moist wastes causes uncertainties.

The most pressing business risk to most companies would currently be staff shortages. With rising numbers of infections and thus quarantined employees, their health and safety should be prioritized. Since not every company or department can switch to remote work, staff shortages might lead to production stops.

For a further outlook we can gain insights from China which is around 2 months ahead of us in time. According to Secretary Xi Jinping, the epidemic will surely bring pain to China's economy in the short term, but will not affect the fundamentals of economic stability in the long term. After three months of fighting the virus and a strongly decelerated increase of new infections, the province Hubei has finally loosened its lockdown.

Chinese manufacturer Huaxin Cement names 3 learnings from the pandemic for the industry:

1. The high value of co-processing. During the crisis, the company co-incinerated a great amount of hazardous medical wastes.

2. The increasing importance of digitalization. Staff shortages are always inevitable and digital solutions provide assistance in these situations.

3. Emergency systems and employees' health and safety awareness need to be continuously promoted.

We can assume that Covid-19 and its consequences will have an impact on our personal lives and the industry for longer than until summer. It remains to be seen how the industry reacts to those influences.

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Overview: RDF Markets in Europe

In the last few years, the European residual waste market has begun to live up to its name: refuse derived fuel (RDF) and solid recovered fuel (SRF) are increasingly traded across national borders. While some countries have more treatment capacity than waste, some are still building new facilities that will need to be fuelled by imports. [1]

The unstandardized RDF market in Europe is mainly targeted for especially equipped plants, whereas standardized fuels are utilised in cement and coal-fired plants [2]. Production quantities of these different types of RDF vary across the European countries, as do treatment procedures and technologies, calorific value and facility utilisation. According to the Record Society [3], heating values, for example, fluctuate between 11.5 and 16.5 MJ/kg for industrial and commercial waste, and between 8.4 and 20.4 MJ/kg for municipal solid wastes across European countries.

Similar differences apply to the utilisation of RDF in Europe. In Germany, for example, 4.5 out of 9 million available tonnes are used for, amongst others, industrial steam production or district heating, 2 million tonnes for cement or lime plants and 1.3 million tonnes for energy and heat generation in municipal waste-incineration plants. In contrast, the Netherlands utilise the total of 3 million tonnes of RDF in waste-incineration plants, as does Italy with 1.2 million tonnes. In Sweden, 1.5 million tonnes are used. [3]

Despite national differences, the countries' supply and demand seem to complement each other and grew into a transnational exchange system. The rise of the export trade broke the link between the waste each country produces and the amount of waste treatment infrastructure it can support.

Transnational Trade

Germany's RDF exports, for instance, continue to increase. Between 2014 and 2018, exports of wastes with the European Waste Codes (EWC) 191210 and 191212 have doubled to 550,000 tonnes [4]. Due to high volumes and capacity shortages within the German incineration market, quantities are shifted abroad and imports continue to decline.

According to [4], Denmark (118,000 tonnes in 2018), Czech Republic and The Netherlands have increased RDF imports from Germany. In total, Germany exported around 709,000 tonnes of RDF and MSW in 2018. The country in total imported 1.23 million tonnes of refuse derived fuels in 2018. While UK imports continue to decrease since 2016 to 387,000 tonnes in 2019 (Figure 1), imports from the Netherlands saw an increase [4]. Overall, however, a further decrease of RDF imports in 2020 is to be expected.

In 2019, the UK has exported around 2.62 million tonnes of RDF and SRF, showing a decrease of 280,000 thousand tonnes compared to 2018. In the Netherlands, waste treatment companies have significantly decreased imported quantities by a total of 120,000 tonnes compared to 2018, except EEW Delfzijl with an increase of 54,000 tonnes of imported RDF. Further countries that decreased imports from the UK are Sweden (-18,000 tonnes to 522,000 tonnes), Norway (-49,000 tonnes to 129,000 tonnes) and Poland, which fully stopped imports from the UK. [5]

Meanwhile, the UK saw an increase in RDF exports from 2018 to 2019 in various other countries, mainly eastern European cement manufacturers. Holcim and Devnya Bulgaria, for example, have doubled RDF imports from UK within the one-year-period to 73,000 tonnes. In Greece, Titan Cement increased imports from 12,000 tonnes in 2018 to 29,000 tonnes in 2019, and in Cyprus Vassiliko's imports grew to 92,000 tonnes compared to 49,000 tonnes in 2017. [5]

Figure 1: *UK* RDF exports to Germany. Source: EUWID Recycling.*

** Exports from England and Wales; from November 2014 only exports from England.*

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Overview: RDF Markets in Europe

Facilitating Factors

Despite the huge quantities that are traded internationally, RDF producing or utilizing plants do not represent an organized value chain in European countries. According to [2], they usually do not result from policy, but the combination of four factors:

- Climate of high or rising prices which is promoting research for alternative fuels.
- Prohibitions / daunting taxes to reduce landfilling: In all countries included in [3] except France landfilling costs are above the mark of 100€ per tonne. Direct incineration must be higher than production or use of RDF.
- Low support from public authorities for plant errection in the power generation sector. Except France, no EU country has such support system at its disposal.
- EU directive 2003/87/CE: Power generated through incineration of contaminated or municipal solid waste is excepted from CO_2 quota.

Across Europe, there is no consistent classification for waste-to-energy plants. Differences in the definition arise from differences in the regulatory systems, and inconsistencies can lead to competitive distortion.

Outlook

According to its latest "Market Report Waste to Energy", German consulting company Ecoprog sees potential in the European waste to energy market. This would be reflected by the around 50 waste to energy plants with a total annual capacity of 18 million tonnes that will be put into operation over the next 5 years. [6]

For Ecoprog, this growth is mainly driven by EU waste policy [6]. According to the EU Landfill Directive, the share of municipal waste landfilled should be reduced to 10 % by 2035, while by end-2024, a quantitative per capita target on landfilling should be defined [7]. In order to implement these targets, the UK has raised its landfill tax substantially, resulting in a jump in RDF exports to 3.4 million tonnes in 2018 [6].

In 2020, Sweden's and the Netherland's import of RDF from the UK might further decrease from new local taxes which make it harder for the countries to export, and thus lead to pressure for the creation of new energy recovery within national borders. This would already be the case in Poland, France and Spain which already had approved or are currently discussing higher landfilling taxes. [6]

The most pressing factor to influence the European RDF market in the near future would be the outbreak of Covid-19. Two factors might impact cross national trade:

Firstly, we can expect capacity shortages in freight traffic due to intensive border controls within Europe. Secondly, restrictions in RDF transport are to be expected. The lack of knowledge around the virus' viability on surfaces or moist wastes causes uncertainties.

Aside from the influences of the current pandemic and in order to boost the European RDF market in the long-term, landfill taxes and prohibitions should be implemented, along with energy taxes and capacity scheduling. At the same time, reduntant legislations should be avoided. Most importantly, waste incineration and co-incineration should be defined consistently across Europe, with the exception of CO_2 quotas for plants with a 100% waste co-incineration. [8]

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Conveying Technology

This abbreviated excerpt from the "Alternative Fuels and Raw Materials Handbook for the Cement and Lime Industry" published by MVW Lechtenberg & Partner, Germany, provides further information about available conveying technologies for alternative fuels.

Introduction

The decision on which method to use for conveyance of alternative fuels to the burner points in the preheater tower or to the main burner depends on the following parameters:

- Volume
- Distance
- Height requiring bridging
- Product quality, e.g. moisture, inert material content, stickiness
- Climatic conditions

At the end of the day the conveying technology to be selected is always a question of investment and operational cost. Apart from the usual pneumatic conveying, mechanical conveying utilising an enclosed conveyor belt, trough chain conveyor, tube or pipe conveyor is state of the art.

1 Pneumatic conveying

Pneumatic conveying has proven itself many times over. Its use depends greatly on the characteristics of the alternative fuel, particularly on moisture and grain size. Fluff with moisture contents at a level of about 10% is conveyed pneumatically up to approximately 200m. The susceptibility to pipe wear, particularly at the elbows, is very high.

Current energy consumption for compressors or blowers is significant and potential pulsating of the conveying air which can occur with certain blow-through gates as a result of wear (false air penetration) is also problematic. However, with pneumatic lines considerable height differences can be bridged simply and economically. The authors recommend employing pneumatic conveying means for short distances of up to 60m. If longer conveying distances are needed each case should be looked at from the point of view of which air volumes and pressures are required to be able to achieve direct conveying to the burner. In individual cases it is also perhaps sensible to erect an intermediate bunker

Figure 1: *Dispersed flow conveying according to [1], courtesy of Prof. Dr. Ing. habil. Karl-Ernst Wirth, University Erlangen, Germany.*

Figure 2: *Pulse flow according to [1], courtesy of Prof. Dr.-Ing. habil. Karl-Ernst Wirth, University Erlangen, Germany.*

Figure 3: *Layer dispersed flow according to [1], courtesy of Prof. Dr.-Ing. habil. Karl-Ernst Wirth, University Erlangen, Germany*

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in close proximity to the burner from which an additional pneumatic conveying action can be performed. Such an intermediate bunker (mainly simple, enclosed hoppers or silos) must be equipped with an appropriate dedusting unit (filter). Selecting a blow-through gate is, among others, dependent upon the materials to be conveyed and the throughput volumes. When conveying by pressure it is important that dispersed flow conveying (as shown in figure 1) of the materials is achieved.

[1] describes: “With dispersed flow conveying the distribution of homogeneous solids can be easily identified. Whereas at lower gas velocity a higher level of deagglomeration of the dual-phase flow arises. In layer dispersed flow state, the solid layer at the floor of the pipe is propelled by the momentum of individual solid particles. A further decrease in gas velocity leads to pulse flow. This is an unsteady conveying state in which during conveying of fine particle goods the danger of machine blockage exists” (compare also figures 2 and 3).

The calculation of the necessary conveying air, pressure and possible conveying volumes should be carried out by specialist firms. The established practice in the cement and lime industry of simply achieving a conveying capacity through an increase in air volume/gas velocities and/or pressure leads to increased pipe wall wear particularly at the elbows. Signs of wear increase with third to fourth power of speed [1]. This also leads to inordinately high energy consumption on the blowers or compressors. The

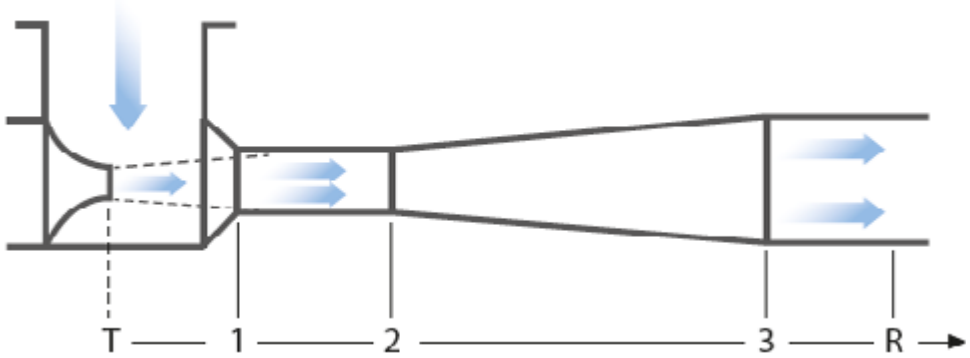

Figure 4: *Injector jet, T: Jet nozzle, T-1: Mixing chamber, 1-2 mixing pipe, 2-3 diffuser, 3-R conveyor pipe according to [1], courtesy of Prof. Dr.-Ing. habil. Karl-Ernst Wirth, University Erlangen, Germany*

Figure 5: *Injector jet with airlock (Source: Di Matteo Fördertechnik, Germany)*

optimum conveying gas velocity and volume is therefore not the maximum volume but only the absolutely necessary volume for prevention of pulse flow or layer dispersed flow. When conveying alternative fuels, one must ensure that the entire conveying systems are absolutely airtight. If conveying gates are unsealed it can lead to air leakage and a decrease in volume flow which can also lead to blockages. Therefore, choosing the right rotary airlock feeders with tightly sealed, adjustable rotary airlocks is vital. The necessary pressure for alternative fuel conveying is, as a rule, fixed in the low to medium pressure range:

a. Low pressure range up to 0.2 bar

b. Medium pressure range 0.2 up to 1 bar

Established feeding units for alternative fuels are injector jets (venturi feeder) and rotary airlocks. Rotary airlocks are most frequently employed. The functioning principle of an injector jet is described briefly at this juncture. The numbers in the text relate to figure 4. According to the description in [1] the injector jet initially expands conically in the mixing chamber (T-1). In this process the overpressure is transformed into air velocities between 100m/s and sound velocity. Both air and solids are sucked in and fed into the jet from above by these high conveying gas velocities. In the attached mixing pipe (2-3) the conveying gas is mixed with the solid material and the kinetic energy of the air is simultaneously transformed into pressure which then becomes available as conveying pressure. To the advantage of the injector jet [1] notes that

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no moving parts are located in the injector jet and manufacturing costs are low. The disadvantage of this type of construction however, according to [1], is the low solid material load of the conveying gas and the low conveying pressures of 0.15 bar. As a result, the injector jet is recommended thanks to the continuous and stable operating mode of a pneumatic conveying unit owing to the low airleak streams. Its area of application however is restricted to low solid loads and short conveying distances. Working principle of an injector jet is shown in schematically in figure 4.

The material feeding is usually done via airlock. Figure 5 shows an example of a combined airlock with an injector jet.

The functioning principle of the rotary airlock is also described in [1]: The rotary airlock doses solids through rotary cells. The solid material

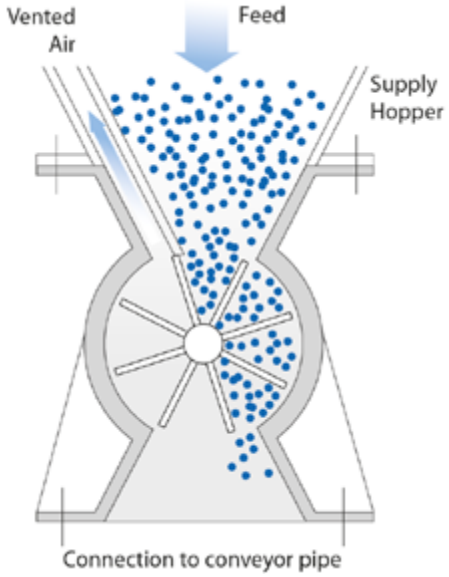

Figure 6: *Working principle of a rotary airlock (Source: [1], courtesy of Prof. Dr.-Ing. habil. Karl-Ernst Wirth, University Erlangen, Germany)*

falls into the chambers and resides for half a rotation before it is fed into the conveying pipe. Owing to the pressure difference between supply hopper and conveyor pipe and the equipment-related interaction between rotary valve and housing, the rotary valve leakage air flows from bottom to top in a circumferential direction and on the front sides. This can, as is shown in figure 6, be conveyed away to be stored once again in the supply hopper. A further possibility for minimisation of the valve leakage air is offered by seals in the individual cell walls to the housing. As a result, this feeding unit is useable in the medium pressure conveying range (0.15 to 1 bar). Owing to the higher conveying pressure larger solid mass flows can be achieved in pneumatic conveying.

Especially when dealing with the physical characteristics of waste-derived alternative fuels a consistent particle size (without long threads or tapes) is critical for pneumatic conveying as it can otherwise result in blockages between the rotary airlock and the housing. The worst-case-scenario is that such housings and rotary airlocks are massively damaged by foreign matter (metals, stones) resulting in air discharge causing volume flow disruption (blockage) or complete airlock failure.

Meanwhile rotary airlocks are offered which are furnished with sharp knife edges to at least prevent blockages. This, however, simultaneously leads to higher energy consumption. Both systems – with soft, locking rubber lip seals and with adjustable cutting edge have proven themselves, but each individual case of material utilisation must be checked.

When longer distances are involved between the alternative fuel feeding device and the feed point to the rotary kiln or calciner the authors recommend, as already mentioned at the beginning of this chapter, either an intermediate bunker or mechanical conveying of the alternative fuels.

2 Mechanical conveying

Mechanical conveying of alternative fuels has proven itself many times over when it involves overcoming greater conveying distances and height distances. Especially for coarser particle sizes of alternative fuels (shredded waste-derived alternative fuels for the kiln inlet or calciner) mechanical conveying has proven to be reliable. The following mechanical conveying means are especially suitable for longer conveying distances:

- Enclosed conveyors
- Chain conveyors
- Pipe conveyors

When using enclosed conveyors, it has to be considered that the product characteristics of the waste-derived alternative fuels require special technical preconditions. As such, totally protected side conveyor coverings as well as easily cleanable transition idlers and pulleys must be used. Also, a removeable and closed underbelt cover is required.

Figure 7: *Enclosed conveyor after fire (Source: MVW).*

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Figure 8: *Detail of a drag chain conveyor for alternative fuels with scrapers and chains (Source: MVW).*

Owing to the bulk weight and the special susceptibility to weathering of the alternative fuels, an enclosed construction method is required. This again leads to increased building costs owing to the building, safety and maintenance regulations which must be complied with. Also, the totally enclosed design of conveyor belts is problematic as the drive and guide rollers become inaccessible. Special precautionary measures need to be taken for fire protection. Otherwise the whole conveyor can be destroyed (compare Figure 7).

Employing chain conveyors or pipe conveyors has shown to be advantageous. Chain conveyors distinguish themselves through compact, stable construction and low conveyor speeds of less than 1m/sec. Through its metal and plastic construction which is used for e.g. directional control explosion protection (ATEX) as well as fire protection, requirements are fulfilled by simple, additional fire prevention or extinguishing devices [2]. Thanks to their construction method, chain conveyors prevent emission pollution caused by airborne fuel particles.

Moist, sticky or oily alternative fuels can be conveyed by chain conveyors. The conveying process in each chain conveyor is performed independently of configuration and alignment by means of a circulating, endless conveyor chain. The scrapers of the chain conveyors are matched to the conveyor trough moulds in such a way that with sufficient movement provision a good and almost residue-free product conveying is achieved without adhesions. As can be seen in the Figure 8, the chains are configured in a way that they do not move in the material flow but are protected at the sides. Material conveying takes place by means of the plastic attachments (scrapers).

Several product feed points and outlets in the upper and lower tower with layer depths, shut-off valves for bunker discharge as well as intermediate outlets also form part of the standard such as dust, oil and gas-proof versions. A high level of operational safety, service and user-friendly monitoring are important features when it comes to conveying equipment criteria. Greater height differences can also be overcome using chain conveyors although no greater angles or kinks can be accomplished in product conveying.

For the conveying of alternative fuels in particular, Hardox® or stainless steel should be selected – especially for lower sections and for the bottom of the conveyor. Surface treatment, for example with polyurethane sheeting may also be useful in order to reduce wear. There are many chain conveyors on the market, also for alternative fuels, in which the chains move inside the material layer. The chain is in direct contact with the material. This should be avoided owing to the high abrasiveness of the alternative fuel.

The chain is largely subjected to a tumescent tensile load. As such these elements need to be very sturdy (fatigue resistant) and be stiff whilst possessing good friction and wear properties. It is therefore important to ensure the chains' load capacity. The low bulk weight and the comparably modest volumes of alternative fuels being conveyed are often underestimated as compacted waste-derived alternative fuels, fibres and tapes contained within them, inert contaminants (glass particles, stones, sand) put considerable strain on the conveying units.

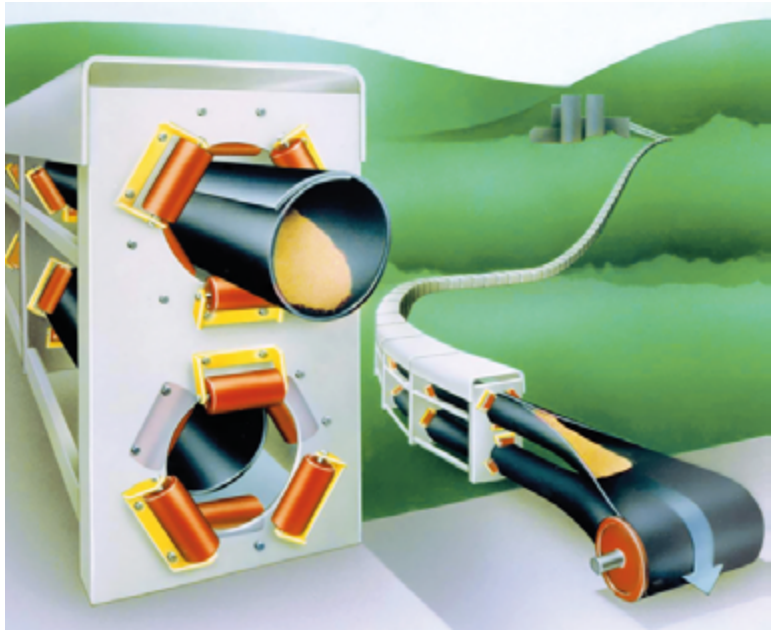

Figure 9: *Working principle of a pipe conveyor. Left: Idler rolls. Right: Opening of closed belt (Source: Beumer, Germany)*

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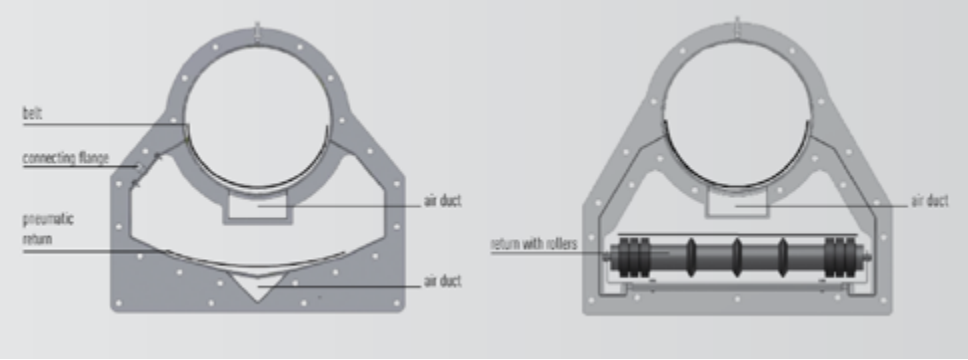

Figure 10: *Schematic cross section of the "VecoBelt" Pipeconveyor. (Source: Vecoplan).*

Figure 11: *A straight "VecoBelt" (with adjacent walkway) transporting RDF from the storage to the calciner (Source: MVW).*

Figure 12: *Detail of the "VecoBelt": A fan supplies the required air for the air cushion (Source: MVW).*

3 Pipe conveyors

Pipe conveyors consist of a conveyor belt enclosed at one pipe between the material feed and the material discharge. The pipe wraps completely around the material by rings of idler rolls. The support and guide stations must be configured at short intervals so that the pipe remains stable. Figure 9 shows the working principle.

In contrast with conventional conveyor belts, pipe conveyors can also be realised featuring arched stretches without the necessity of the usual transfer stations. The curves can be horizontal, vertical or a combination of both. The ascending capability is up to some 25 degrees [3], which results from the larger contact surface by comparison with traditional conveyor belts. In addition, the enclosed conveyor belt avoids spillages so that dust emissions and hence the risk of explosions are minimised. Long distances, e.g. up to 2,000m and more can be covered easily. Pipe conveyors are used to transport a wide variety of materials, e.g. limestone, ash, coal and fluffy alternative fuels.

The advantages of pipe conveyors feature the adoption of significantly steeper inclines than a conventional conveyor belt, the ability to incorporate small-radius horizontal curves, thereby eliminating series conveyors and the associated transfer points [4].

From the authors' experience, pipe conveyors are the most reliable solution for feeding alternative fuels. They distinguish themselves by overcoming long distances without difficulties and additionally by low maintenance and operating costs.

Some time ago, the company Vecoplan developed the pipe belt conveyor "VecoBelt". It is designed for conveying bulk materials over long distances either horizontally or on a slight incline. The material glides on a cushion of air in a closed steel tube. No idlers are required. Therefore, there is low frictional resistance by air bearing below the belt. Figure 10 shows a schematic cross section of the conveying system.

Besides power for the belt drive unit, extra power for the fan has to be considered. For example, a conveyor of 80 m length (with a pipe diameter of 0.51 m, conveying capacity 720 m³/h) requires 7.5 kW for the drive, and 4 fans with 4.4 kW power connection in total.

A great advantage of the VecoBelt is the low requirement for supports compared to conventional belt conveyors. It can effectively span up to 75 m self-supporting with suspension ropes fixed on pylons. In contrast to other pipe conveyors, however, only straight lines are feasible.

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Alternative Fuel Award 2020 Call for Candidates

In 2018, MVW Lechtenberg & Partner has presented the Alternative Fuel Award for the first time. The AFA is established to encourage the acceptance of the ecological responsibility on both social and individual levels, and to identify role models in the field of alternative fuels, a field which, aside from its contribution to the economic development, has the greatest contribution to the protection of our environment.

Following the successful presentation of the Alternative Fuel Award to companies from Egypt, South Africa and Canada in 2019, MVW Lechtenberg & Partner, Duisburg, is now announcing the "Alternative Fuel Award" for the third time.

We therefore gladly invite companies, cities, municipalities, institutions and individuals who have implemented or are currently implementing projects for the production, use or research on alternative fuels (from waste or biomass) to participate in the Alternative Fuel Award Competition 2020.

The award will be presented as part of the **7th Alternative Fuels Symposium on 8 – 10 September 2020**. The award ceremony will take place during a Gala Dinner on 9 September.

The first winning project will be rewarded with 5,000 €, in addition to travel costs and participation fee for one delegate to the symposium. The second and third winning projects will receive the "Alternative Fuels and Raw Material Handbook for the Cement & Lime Industry", a comprehensive compendium for the industry, in addition to free participation for one delegate.

At the same time, the winning projects' representatives will present their projects in form of a lecture at the symposium to the international alternative fuels' community.

The submission deadline for project proposals is June 30, 2020.

The prizewinning study will be selected by a board of expert reviewers and the judges' decision is final. Apply now through the online form at www.lechtenberg-partner.de/symposium/alternative-fuel-award.

Best of luck to all the participants!

Scan here to apply!

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Mir Kazim Ali (right) accepts the 3rd AFA 2019 on behalf of PSCL, presented by Dirk Lechtenberg, MVW Lechtenberg & Partner.

Co-Processing Magazine of Alternative Fuels & Raw Materials

AFA 2019 3rd Winner: PSCL

Waste Fuels Information Management System (WFIMS) for Geocycle

Introduction

As countries work towards reducing the amount of waste going to landfill and changing climate policies, a global awareness of emission reduction has driven an increase in alternative fuel consumption by the cement industry. Diversion of waste for energy recovery has become an important aspect of waste management for many countries. A major factor in driving this sector is the need for resource conservation, energy recovery, and recognizing the potential economic and environmental benefits of waste-to-energy recovery.

In January 2018, the U.S. Environmental Protection Agency (EPA) established the e-Manifest system according to the Hazardous Waste Electronic Manifest Establishment Act, enacted into law on October 5, 2012. The "e-Manifest Act" authorizes the EPA to implement a national electronic manifest system and required that the costs of developing and operating the new e-Manifest system be recovered from user fees charged to those who use hazardous waste manifests to track off-site shipments of their wastes.

In response to the e-Manifest and in consideration of the energy recovery potential of waste as alternative fuels, Process Solutions Canada Limited (PSCL) partnered with Missouri Fuel Recyclers, a subsidiary of Continental Cement Company, introducing a Waste Fuels Information Management System (WFIMS) in 2000. PSCL has been working with the cement industry since 1985, providing solutions to help cement producers manage quality and improve logistics. The WFIMS e-Manifest Interface has been implemented for LafargeHolcim (Geocycle/Systech).

Background

Across the US, the Uniform Hazardous Waste Manifest (UHWM) is a paper form required by the Environmental Protection Agency (EPA) and the Department of Transportation. Generators must produce the UHWM to transport hazardous waste to treatment, storage, and disposal facilities (TSDFs). This is a key document that includes tracking information related to the waste being transported, instructions on how to handle the material, and signatures and dates

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for each party involved in the transportation and disposal of the waste.

Each party involved in the handling of the waste retains a signed copy of the manifest. Once the waste reaches its destination, the TSDF sends a signed copy of the final manifest back to the generator to inform them that the waste has reached its destination.

Historically, it was each party's responsibility to maintain its copy of the signed paper manifests. The submission of paper manifests to the EPA was not required. The proposal to move from paper-based manifests to electronic manifests was initiated by the EPA in May 2012. The stated benefits were the following:

- Cost savings.
- Better and timely information on hazardous waste shipments.
- Faster notification on discrepancies related to shipments.
- A single portal for the reporting of manifest data to both the EPA and states.
- Improved compliance monitoring of waste shipments by regulators.
- The integration of manifest reporting with the biennial report from the Resource Conservation and Recovery Act (RCRA).

On 5 October 2012, the Hazardous Waste Electronic Manifest Establishment Act was enacted, authorizing the EPA to implement a nationwide electronic manifest system. This act requires that the cost of developing and operating this system be recovered by user fees that are charged to users of the electronic manifest system to track hazardous waste manifests for off-site shipments of hazardous waste. The fee schedule at that time was not finalized, but it was known that submitting paper manifests would be significantly more expensive than submitting a manifest electronically, the fee schedule is shown in Table 1.

Essentially, TSDFs that would be able to submit their manifests electronically could save more per manifest than those that would continue to record (and thus submit) their manifests via paper. In the short term, those that could take advantage of the cheaper option could see an immediate cost savings benefit.

In the long term, the EPA is only planning to support the submission of paper manifests until 30 June 2021, at which time an electronic method of submission will be required by all TSDFs. Development of the EPA as e-Manifest system started in 2014, with architecture discussions of the back-end system. Not until June 2017 were a series of web services made available for user experience testing. The target production release date was still on track for official release on 30 June 2018.

Manifest submission type	Fees/Manifest
Paper	USD $15.00
Scanned Image	USD $ 10.00
Data + Image	USD $ 6.50
Fully Electronic	USD $ 5.00

Table 1: *Fees per manifest by submission type. Source: PSCL.*

The WFIMS

The Waste Fuels Information Management System was originally designed as a cradle-to-grave system for tracking waste, with the main goal of being the primary system for billing, reporting, and safety. The introduction of the EPA's e-Manifest system triggered PSCL to add environmental regulatory compliance to the list of features and benefits of the WFIMS. With this feature, WFIMS would help producers to realize an up to US$10 saving per manifest submitted. For one company, with 10 sites averaging 100 daily shipments, this represented US$3 million in annual savings.

The system provides data and physical management solution in the scope of the waste-to-energy industry primarily focused on both hazardous and non-hazardous waste as alternative fuels for use in cement manufacturing. The original and subsequent projects demonstrate that the use of an application such as WFIMS is critical in reducing the costs and barriers of entry into using waste fuels as an alternative fuel source.

The WFIMS has been successfully meeting waste handling practices as a corporate standard system for LafargeHolcim North America since 2003, providing a stable and scalable solution for 15 hazardous and non-hazardous waste handling facilities. In 2016, LafargeHolcim merged its waste fuels subsidiaries Geocycle and Systech into a single business unit expanding the number of locations using WFIMS to 23.

By September 2019, WFIMS has been implemented at several Geocycle facilities of LafargeHolcim (Table 2).

The WFIMS suite provides cradle to grave data tracking and storage tailored to the needs of the consuming cement producer. The suite was built to support a TSDF regulatory requirements of the EPA to meet hazardous waste permitting standards. The software supports the TSDF site operating processes at all stages of waste fuel handling.

The goals of the WFIMS implementation project are:

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Site Name	Size	Haz / Non Haz	Location
Tulsa	Small	Hazardous	Oklahama, USA
Artesia	Medium	Hazardous	Mississippi, USA
Fredonia	Large	Hazardous	Hazardous
Holly Hill	Large	Hazardous	South Carolina, USA
Paulding	Large	Hazardous	Ohio, USA
Alpena	Small		Michigan, USA
Bath	Small		Ontario, Canada
Brookfield	Small		Nova Scotia, Canada
Hagerstown	Small		Mary Land, USA
Joppa	Small		Illinois, USA
Ravena	Small		New York, USA
Richmond	Small		British Columbia, Canada
Ste Genevieve	Small		Missouri, USA
Theodore	Small		Alabama, USA
Dorchester	Medium		South Carolina, USA
Midlothian	Medium		Texas, USA
St. Constant	Medium		Quebec, Canada
Whitehall	Medium		Pennsylvania, USA
Ada	Large		Oklahoma, USA
Devil's Slide	Large		Utah, USA
TRM	Large		
Coloarado Springs	Large		Colorado, USA
Dundee	Not Licensed	n/a	Michigan, USA
Portland	Not Licensed	n/a	Colorado, USA
Dandenong (Cement Australia)	Medium	Hazardous	Australia

Table 2: *Sites using WFIMS. Source: PSCL.*

AFA 2019 3rd Winner: PSCL Waste Fuels Information Management System (WFIMS) for Geocycle

- Meet regulatory requirements for electronic submission of Hazardous Waste Manifest reporting
- Promote waste energy recovery through incineration
- Reduce fossil fuel energy consumption and CO_2 emissions
- Lower manufacturing raw material and production costs
- Operational and Regulatory Data Management
- Waste Material Handling Health & Safety Risk Reduction

Technical Concept

The WFIMS is an integrated software suite that delivers a comprehensive data management system for waste fuel consumers to collect, validate, store, and report regulatory and operational information. It supports each stage of the waste handling processes and includes modules to support the site operating procedures for qualification and site approvals, transportation scheduling, shipping documents, laboratory analysis, and customer invoicing. Each module has been purposely designed in partnership with the TSDF customer.

WFIMS supports the customer's business to obtain recoverable resources through managed waste treatment and provide a consistent valuable energy supply for cement manufacturing. According to PSCL, the system decreases waste handling operational costs and improves administrative efficiencies.

The WFIMS includes a built-in health and safety component providing a necessary framework for integrating safety and emergency response procedures alongside the waste material data. The health and safety module collects, organizes, and alerts operational personnel and material handlers for safe handling practices. For each waste stream, health and safety precautions for the material handler are presented along with recommendations for Personal Protective Equipment (PPE), Globally Harmonized System (GHS) labeling, and waste compatibility data management.

The health and safety component enables the configuration and data management for chemical constituent compatibility to alert personnel to harmful or dangerous waste material combinations. User prompts, warning messages, and targeted health and safety reports provide actionable safe material handling information that complements the site's operational health and safety policies. The system assists with the identification of safety risks and the level of risk for every material that arrives on site.

PSCL is constantly innovating and improving the system to keep customers adaptable to changes in the circular economy. In 2011, the

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AFA 2019 3rd Winner: PSCL Waste Fuels Information Management System (WFIMS) for Geocycle

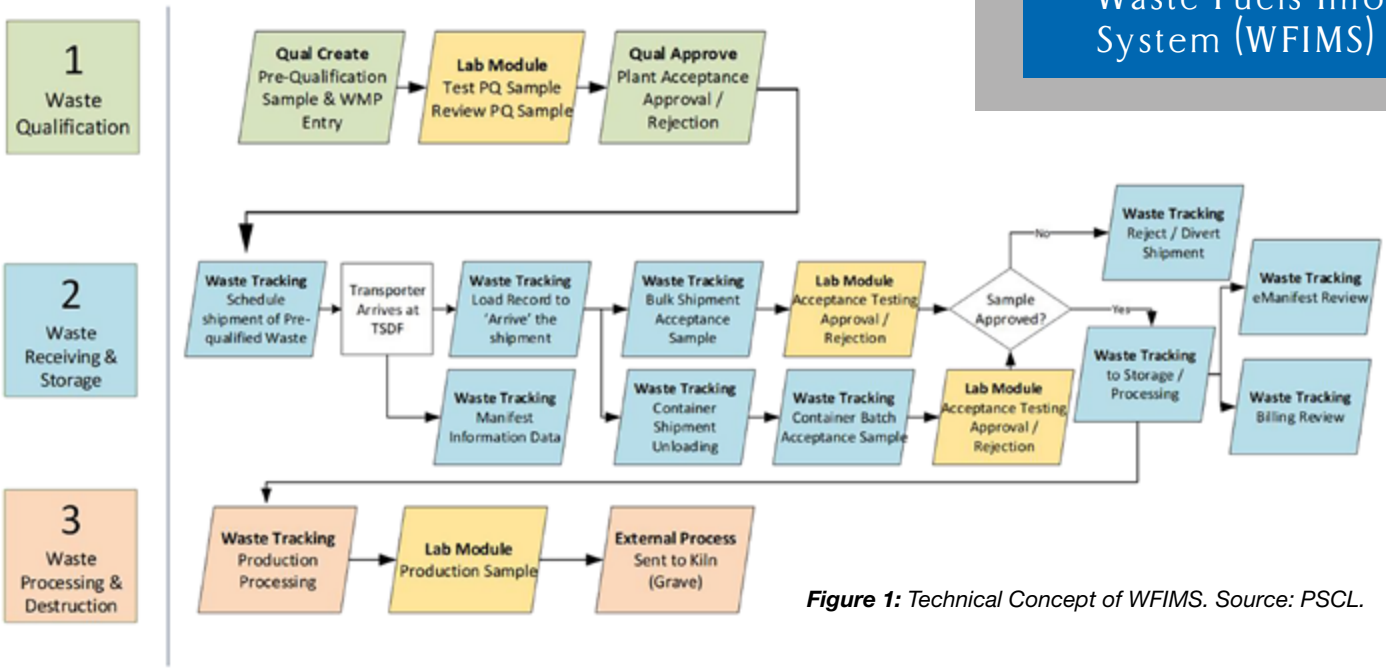

Figure 1: *Technical Concept of WFIMS. Source: PSCL.*

company customized a solution to collect waste receiving data from a GIS vehicle fleet tracking system. The solution helped the customer optimize the waste material collection services and reduced the data entry effort by 40%.

The major changes to the WFIMS included the following:

- Additional data collection to the existing manifest forms to support required fields for the EPA e-Manifest system.
- The inclusion of RCRA Biennial Report information, along with each submitted manifest.
- Support for different waste codes/states, in addition to federal waste codes.
- Support for dealing with partial and full manifest rejections.
- Support for a manifest review process within the WFIMS.
- Support for the submission of manifests from the WFIMS to the EPA e-Manifest system.

Permitting and Costs

PSCL is not responsible for any permitting, all permitting responsibility is on the client handling the waste material.

The implementation cost of the WFIMS software is per site and depends on the waste material handling site classification as either hazardous or non-hazardous, and the size (small, medium, large) of the facility. It varies from USD 50,000 – 80,000 per site. All customization to meet specific client site requirements are additional.

The running costs are 12.5% of the total license cost per site which cover regular upgrades and 24/7 support provided by a dedicated team of Customer Support & Integration Analysts.

Conclusion

WFIMS supports cement producers' goals to use alternative fuels including refuse-derived fuels (RDF) as a means to transition from a linear value chain to a circular economic model. The system actively promotes cogeneration through decreased alternative fuel handling costs, improved administrative efficiencies, and regulatory compliance and has facilitated the processing of great amounts of alternative fuels (Figure 2).

PSCL continues to work to support EPA e-Manifest as it evolves. As the EPA adds more functionality to its web services, WFIMS will continue to add functionality and benefits for producers.

MVW Lechtenberg & Partner congratulates PSCL for winning the 3rd AFA 2019. The project demonstrates that the use of an application such as WFIMS is critical in reducing the costs and barriers of entry into using waste fuels as an alternative fuel source.

WFIMS Throughput

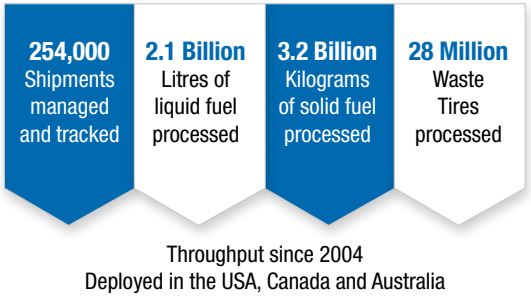

Figure 2: *WFIMS throughputs since 2004 in the USA, Canada and Australia. Source: PSCL.*

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Belgium

EU Plans Support for Heavy Industry's Climate Challenge

Reuters reports that the European Union will review state aid rules to launch a project for clean hydrogen production. This could help European firms to replace fossil fuels and thereby maintain a competitive edge in global markets as they embark on large-scale emissions cuts.

The EU industrial strategy, unveiled by the executive European Commission on 10 March, lays out a long-term vision to steer industry towards the goal of a net greenhouse gas emissions reduction to zero by 2050.

The Commission will propose a public-private "alliance" to produce clean hydrogen, following the model of an 8.3 billion euro battery project involving seven EU countries and 17 companies.

Using hydrogen as an alternative fuel source to coal or gas could slash emissions in hard-to-decarbonise sectors like steel and cement, but the technology remains prohibitively expensive. Other EU alliances will follow for low-carbon industries, cloud data and raw materials.

Source: Reuters: "EU plans support for heavy industry's climate challenge". Retrieved 10 March from https://www.reuters.com/ .

Cuba

Cementos Cienfuegos S.A. Using TDF

The enterprise Cementos Cienfuegos S.A. is burning useless tires to use as an energy source and, in this way, reduce this waste's environmental impact. Fuel imports for its own operation are replaced at a time when the island is experiencing difficulties with fuels supply due to the U.S. sanctions against the island for its support of Venezuelan President Nicolás Maduro, as well as the current crisis in Venezuela, the island's main ally and supplier of oil.

Carlos López, technical deputy manager of the enterprise, explained to a local newspaper that this production is still in an initial phase, in which 130 to 150 vehicle tires are processed per day. According to the official, by mid-February they have processed more than 3,600 tires, but hope to multiply that figure and reach 400 tires per day.

Cuban President Miguel Díaz-Canel called for taking advantage of this alternative means of fuel production during a recent visit to Cienfuegos. According to López "many entities, even based in the eastern part of Cuba, are willing to bring them" and "steps" are being taken to ensure their transfer. "In this way, when they come loaded with tires they can return with cement, representing zero cost for the factory," he said.

The company plans to replace 5% of its traditional fuel, pet coke, of which it expects to import about 100,000 tonnes of 2020. The systems applied in the factory are endorsed by the Ministry of Science, Technology and Environment, the Ministry of Interior and the Fire Protection Agency.

Source: On Cuba News "Cuban Enterprise Burns useless Tires to use as Fuel". Retrieved 28 February from www.oncubanews.com.

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Egypt

Whole Village Makes a Living on Used Tires

The social as well as economical value of recycling what others abandon as waste is shown in the example of Egyptian village of Mit al-Harun. For decades, residents make their living by recycling used tyres into baskets, landscaping materials and alternative fuels.

The small Nile Delta Village, some 70 kilometres (43 miles) north of Cairo, has gained a reputation as Egypt's top rubber recycling hub.

Used tyres from across the country are delivered to Mit al-Harun and sold for up to 70 Egyptian pounds per tyre. After cutting the tyres and separating materials, such as wire rings, they are shredded for use in i.e. cement factories, as alternative fuels.

Source: "Egypt Village Turns a Profit on Used Tires". Retrieved 21 January from https://aawsat.com/

Germany

Beumer Group Develops Screw Weigh Feeders for Alternative Fuels

To feed an alternative fuels' material mixture with different bulk densities and an extremely high moisture content, Beumer Group in cooperation with its customers developed a screw weigh feeder that can be equipped with an automatic calibration system. The system is suitable for the continuous, controlled, and reliable transport of various bulk materials. The company claims that even explosives can be safely conveyed as all components are available also in ATEX version.

The controlled feeding capacity is up to 30 tn/hr. The system is dimensioned for bulk densities reaching between 0.08 and 0.8 tn/cu m and the regulation ration is 1:20. Depending on the local conditions, the weighing tolerance is between 1 and 2 percent and enables high consistency in controlled feeding. In addition, the completely closed screw weigh feeder is protected against dust and other environmental stress.

Source: Beumer Group GmbH & Co. KG [29.01.2020].

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India

Clean Kerala Company Signs Agreement with Coimbatore-Based ACC Ltd. for Collection of Non-Recyclable Plastic Waste

With Clean Kerala Company Ltd. arriving at an understanding recently with cement manufacturers for the handing over of non-recyclable, non-biodegradable waste to be used as alternative fuel in these factories, the city's administration hopes for a variety of waste generated to be utilised. The agreement with Coimbatore-based ACC Ltd. for the collection of non-recyclable plastic waste has been signed in February.

The performance evaluation of co-processing of plastic waste was carried out in ACC Ltd.'s plant in Madhya Pradesh. In its report, the Central Pollution Control Board found it to be a successful method in waste processing.

In the initial phase, the Clean Kerala Company will be providing 2,000 metric tonnes of non-recyclable, non-biodegradable waste, collected from municipalities across the state. In a few cases, local bodies in the State have already made arrangements with cement manufacturers on their own.

"Once this is done, the only waste that remains to be addressed are napkins and diapers, for which we are planning to set up incinerators this year itself," said a Corporation health official.

Source: The Hindu: "Non-biodegradable waste to be used as alternative fuel in cement factories". Retrieved 5 March from www.the-hindu.com .

Ireland

Conflict Around Irish Cement Plans to Burn Waste at Limerick

The Environmental Protection Agency (EPA) will hold oral hearings into concerns raised in Limerick (Ireland) over plans by Irish Cement to replace fossil fuels with alternative fuels, including tyres and animal faeces at its production factory in Castlemungret.

More than 4,000 submissions were received by individuals or groups who objected to the EPA after Irish Cement has been granted a proposed licence to burn up to a maximum of 90,000 tonnes of waste per year, since it provided it was non-hazardous, and met more than 100 strict conditions.

The EPA Board said the oral hearing was "merited, given the scale, sensitivity, of the local environment and the importance of the proposed development both national and regionally".

Since last October, protesters express concerns about toxic smokes as a threat to human health.

Irish Cement refutes the charge, saying there had been no change in the type or quantity of emissions when other cement factories employed the same. Furthermore, Increasing the use of alternative fuels in Ireland's cement kilns is also a key target in the Government's recent Climate Action Plan.

Source: David Raleigh: "Oral hearing into Irish Cement plans to burn waste at Limerick base". Retrieved 6 March from https://www.breakingnews.ie/ .

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Mexico

CDP Rates CEMEX A- for Climate Protection

CEMEX announced that CDP (formerly Carbon Disclosure Project) raised its rating of CEMEX from B in 2018 to A- in 2019 for the company's commitment to climate protection. The rating upgrade reflects CEMEX's improvement in governance, risk management, CO_2 emissions reduction initiatives, low carbon products, and value chain engagement.

"We are very pleased not only that our CDP score has improved, but also that it reflects our company's continued effort to achieve a robust climate change strategy, which is helping us to reduce our operations' CO_2 footprint. So far, we have reduced our net specific emissions per tonne of cementitious product by more than 22% when compared to our 1990 baseline, putting us on track to accomplish our ambitious science-based targets for 2030," said Vicente Saiso, Corporate Sustainability Director of CEMEX.

To date, CEMEX has reduced its direct CO_2 emissions per ton of cementitious product by more than 22% compared to its 1990 baseline, allowing the company to avoid approximately 8 million tonnes of CO_2 during 2019, equivalent to the carbon emissions of 1.6 million passenger vehicles.

The company is taking the following steps to further reduce its direct CO_2 emissions:

- Producing new types of low CO_2 clinker, cement, and concrete products
- Increasing the use of alternative fuels as a substitute for fossil fuels
- Using waste from other industries as alternative raw materials as a substitute for clinker
- Expanding and protecting natural carbon sinks from El Carmen Nature Reserve to all of its quarries
- Developing and testing disruptive technologies like carbon capture, utilization, and storage (CCUS) and other innovative carbon technologies

Source: Cemex, S.A.B. de C.V.: "CDP raises CEMEX rating for leadership in climate change transparency and action". Retrieved 28 January from https://www.cemex.com/.

Norway

Geminor: RDF to Become Main Fuel Source in Cement Industry

The Norwegian RDF supplier expects waste fuels such as SRF to become the preferred source of energy for cement production due to growth in residual waste volumes and stricter EU regulation. The 2020's would be the decade for secondary fuels in cement production, argues cement industry expert at Geminor, Per Cederberg.

In the company's blogpost, it is added that Confederation of European Waste-to-Energy plants (Cewep), has estimated that by 2035 around 142 million tonnes of residual waste treatment capacity will be needed in Europe. Current thermal treatment capacity stands at around 90 million tonnes while co-combustion capacity stands at around 11 million tonnes.

Even if the EU reaches its ambitious recycling and circular economy objectives, there would still be around 40 million tonnes of non-recyclable waste for which there was no treatment capacity. The recent drop-off in exports of waste to Asia, combined with future increases in total waste volumes, would mean increased potential for the steady supply of residual waste fuels, according to Mr Cederberg.

Source: Geminor: "Why the 2020's is the decade for secondary fuels in cement production". Retrieved 28 January from https://geminor.no/.

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Oman

Be'ah and Oman Cement to Supply Alternative Fuels Derived from Tyres

With the aim of converting end-of-life tyres to fuel that can be used in cement production, the Oman Environment Holding Company (be'ah) has signed an agreement with Oman Cement to supply fuels derived from end-of-life tyres at the Oman Cement Company's headquarters.

This project of using waste as alternative fuel is considered the first-of-its-kind in the Sultanate. With regard to the objectives of the agreement, Eng. Tariq bin Ali Al Amri, CEO of be'ah stated, "This agreement seeks to achieve be'ah's strategy by adopting practices that ensure waste management in a sustainable manner, and safe disposal of waste materials by using them in energy production, or extracting raw materials for added value."

Eng. Salem bin Abdullah Al-Hajri, CEO of Oman Cement Company, indicated that "this agreement will achieve our strategic goals with regard to the diversification of energy sources and the use of other sources to convert fuel that will be used for cement production."

The agreement will contribute to the national economy and provide business opportunities for small and medium enterprises through the production and transportation of fuel from engineered landfills to the cement factory; where approximately 30,000 tonnes per year of expired tyres will be processed.

the Oman Cement Company is working in co-operation with be'ah during the past two years to study ways of cooperation between the two companies to take advantage of waste as an alternative fuel for natural gas that is currently used in the cement manufacturing furnaces at Oman Cement factory located in Muscat. The study proved that the end-of-life tyres are the best and the most suited waste stream for this purpose, and the easiest in terms of handling.

The study also concluded that the factory systems are ready to deal with gas emissions resulting from tyre burning operations without any damage to the surrounding environment. Several precautionary procedures have been proposed for safety and security measures.

The two parties wish to work together to develop an implementation mechanism to diversify the energy sources through the use of alternative fuels derived from expired tyres.

Source: Times of Oman: "be'ah and Oman Cement to supply alternative fuels derived from end-of-life tyres". Retrieved 9 February from https://timesofoman.com/

Philippines

Holcim Increases Alternative Fuels Consumption

Cement maker Holcim Philippines Inc. plans to increase its consumption of qualified and properly segregated and pre-processed waste as alternative fuels and raw materials to manage costs and help ease the garbage challenge in the country.

Through its waste management unit Geocycle, Holcim Philippines reported using more than 170,000 tonnes of waste materials last year as alternative fuel and raw material for its production. This translated to 38 days of avoiding coal in cement production, and therefore, lower carbon emissions from the company's operations.

In 2019, Holcim Philippines agreed to pre-process the segregated wastes of several local governments near its plants in Luzon and Mindanao as alternative fuel, and expressed readiness to help more communities on this matter. The company has also co-processed tens of thousand tonnes of non-recyclable plastics as it continues to provide waste management services to partners in various industries.

Holcim's efforts come as environment authorities sounded the alarm last year on garbage management in the country highlighting the need for concerted effort from various sectors as continued economic growth has led to an unprecedented generation of waste.

Source: Manila Standard: "Cement maker turns 170,000 tons of waste into fuel". Retrieved 16 March from https://www.manilastandard.net/ .

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South Korea

Asia Cement Awards New Order to KHD Humboldt Wedag

Asia Cement Company Ltd (Korea) awards Humboldt Wedag GmbH with a supply and engineering contract for the modernization of its 3rd clinker production line located close to Jecheon-si, Korea. The target of the upgrade project is to increase the alternative fuel substitution rate to above 85% of calciner fuel, as well as the reduction of NOx to satisfy local emission limits.

KHD's scope includes the engineering and supply of mechanical equipment for the clinker production as well as electrical equipment for the overall modernization of the production process. During the project, the existing preheater will be modernized with the installation of new PYROCLON R® calciner, as well as a PYROROTOTR®, a state-of-the-art rotary combustion reactor for low-processed alternative fuel.

The overall project scope consists of the following equipment and upgrades:

- PYROCLON R® calciner with PYROTOP® mixing chamber
- PYROROTOR® alternative fuel combustion reactor
- PYROBOX® coal firing system for process start-up and operation balancing
- Replacement of stage 5 cyclones with new high-efficiency cyclones for calciner connection and an overall pressure drop reduction
- Bypass mixing chamber installation
- A new kiln inlet chamber with orifice

The commissioning of the modernized production line is planned for the first quarter 2021.

Source: KHD: "KHD signs next Pyrorotor contract in South Korea". Retrieved 14 February from https://www.khd.com/ .

UK

MPA Cement Sustainable Development Report

MPA Cement has published its 2019 Sustainable Development Report, based on data provided by MPA Cement's five member companies who together supplied 78% of the cement consumed in the UK in 2018.

The report highlights the UK cement industry's contribution to the circular economy, such as a reduction in CO_2 emissions by 25% from 1998, which is due to the industry's success in improving its carbon footprint by increasing energy efficiency, using alternative fuels instead of traditional fossil fuels, and utilizing renewable energy sources. In 2018, 1.4 million tonnes of waste and by-products from other sectors were recycled by the UK cement industry, resulting in a recycled content of cement of almost 10%. Waste-derived fuels replaced 43% of the fossil fuel energy demand.

Cement continues to be a key contributor to the £152 billion construction industry. Domestic cement sales have increased 29% since 2012 but 2018 sales were 1% lower than 2017.

Dr Richard Leese, director of MPA Cement, said: 'In the years ahead, the challenges will become tougher and will require co-ordinated effort from the industry, the supply chain, government and its agencies. MPA is ready to play its part.'

Source: Agg-Net: „MPA Cement Sustainable Development Report". Retrieved 11 February from https://www.agg-net.com/.

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UK Watchdog to Scrutinize How Companies, Auditors Calculate Climate Risk

Britain's financial accounting watchdog plans to review how companies and auditors assess and report the impact of climate change on their businesses, as investors push for better disclosure of the risks.

Climate change has surged to the top of the agenda for investors as policy-makers demand companies step up efforts to drive the global transition to a low-carbon economy.

"Auditors have a responsibility to properly challenge management to assess and report the impact of climate change on their business," Financial Reporting Council (FRC) Chief Executive Jon Thompson said in a statement.

Many money managers are concerned the information they are given by companies and the accounts signed off by auditors do not give a full picture of the risks, leaving them vulnerable to steep losses. In response, the FRC said its review will look into the extent to which British companies and auditors are responding to climate-related issues to ensure reporting requirements are met.

Stephanie Pfeifer, chief executive of the Institutional Investors Group on Climate Change, said the review provided an opportunity to clarify the responsibilities of auditors and ensure climate risks were properly evaluated. "Assessing the impact of climate change on asset values for companies with high carbon assets must be a crucial aspect of the auditing process," she said.

Source: Reuters: "UK watchdog to scrutinize how companies, auditors calculate climate risk". Retrieved 21 February from www.reuters.com

Hanson UK to Research Use of Climate-Neutral Fuels for Cement Production

HeidelbergCement subsidiary Hanson UK will carry out cement production using hydrogen biomass fuels on an industrial scale at its Ribblesdale cement plant. The results will then be shared across the industry to maximise potential environmental benefits of the technology.

According to HeidelbergCement, the project will investigate the potential to reduce carbon emissions by switching from fossil fuels to hydrogen and plasma technology.

Dr Dominik von Achten, CEO of HeidelbergCement, says: "We have been very effective across the Group in reducing our CO_2 emissions, partly through the steadily increasing use of alternative fuels. In addition to our activities in the field of carbon capture, use and storage, this project in the United Kingdom is an important step towards realising our vision of producing CO_2-neutral concrete by 2050"

The initiative has been coordinated by UK industry body the Mineral Products Association and is funded by a £3.2 million award from the Department for Business, Energy and Industrial Strategy.

Source: Aggregate Reseach: "HeidelbergCement uses climate-neutral fuels in the UK". Retrieved 5 March from www.aggregateresearch.com .

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