Scandinavia's gypsum recycling solution

Henrik Lund-Nielsen,
Chairman, Gypsum Recycling International A/S

GG Gypsum Recycling International has successfully implemented a gypsum recycling scheme in a Denmark and Scandinavia over the last two year: the proprietary system is now being made available in the rest of the world.

GG Gypsum Recycling International a mis en oeuvre avec succès un plan de recyclage du gypse au Danemark et en Scandinavie au cours de ces deux dernières années : le système breveté est aujourd'hui disponible dans le reste du monde.

GG Gypsum Recycling International konnte innerhalb der letzten zwei Jahre ein Gips-Wiederaufbereitungs-Programm in Dänemark und Skandinavien implementieren: das in Eigenarbeit entwickelte System kann nun auch weltweit eingesetzt werden.

GG Gypsum Recycling International ha implantado con éxito un programa de reciclaje del yeso en Dinamarca y Escandinavia durante los dos últimos años. Ahora, este sistema propiedad de la empresa se ofrece al resto del mundo.

Everywhere in Europe the pressure to decrease depositing waste at landfills and increase recycling activities is becoming more evident.

Although recycling activities covering construction and demolition waste have grown significantly in the past decade all over Europe, around 20-25% of the waste ending up at European landfills is still coming from construction and demolition (C&D) activities. Gypsum waste is one of the most important fractions from C&D, if not the most important fraction that has not been recycled until now. It has been calculated that gypsum waste makes up 3-6% of all waste at European landfills and adds up to a total of approximately 3Mt annually.

Now, there is an alternative to landfilling gypsum waste. Gypsum Recycling International A/S, a Danish company, has successfully implemented a gypsum recycling system in Denmark and Scandinavia during the past two years. The system converts new construction - and demolition - gypsum waste into gypsum powder that the gypsum industry can use to make new virgin materials. The system is economical, profitable for the gypsum industry as well as beneficial for the environment.

This system is now being made available to the rest of the world.

In fact, 20 years of experience from demolition works and recycling of other C&D materials paved the way for recycling of gypsum

Gypsum Recycling International A/S was founded by its present CEO, Karsten Rasmussen, who has also within the last 20 years built the largest demolition company in Scandinavia, NKR Demolition Group.

The extensive involvement in the demolition industry including the participation in recycling of almost 1Mt/year of other C&D materials like cement and asphalt, led Rasmussen to believe that gypsum waste could also be recycled. His vision and his investment of millions of Euros made it possible to create the new gypsum recycling system that during the last couple of years has proven its worth in the Scandinavian market.

The mobile recycling unit from Gypsum Recycling International

A complete system

Karsten Rasmussen not only focussed on making a recycling plant, but also developed all parts of the system to optimise the flow from the waste that was created until it was reused by a gypsum board manufacturer.

Therefore, the Scandinavian solution not only contains a unique and proprietary recycling facility, but also specially-developed containers, an economical logistic system and users that really benefit from the recycled materials. Thus, the system consists of four separate and yet interconnected parts, described below.

Containers

Gypsum Recycling International developed special containers for the collection of gypsum waste. The containers are required by the waste owners to separate gypsum waste from the rest of the waste.

The containers are located at new building sites, reconstruction sites, demolition sites, waste transfer stations and other places, where a steady volume or large amount of gypsum waste can be found.

The containers are equipped with lids on the front and on top, to allow the users easy access when filling them and to make waste

removal more efficient.

In other parts of the world, wet gypsum waste tends to be a major concern and many resources are applied in the attempt to dry up the waste. Special containers from Gypsum Recycling International prevent waste from being wetted in the first place.

Most often the containers are filled from the front side and unloaded from the top by using the hydraulically assisted lid.

Logistic system

The containers are unloaded regularly. A truck with a grab unloads the containers and weighs the amount of waste collected at that site. This information is used to invoice the waste owner. The cost for the waste owner is lower than the cost of transporting the waste to a landfill and paying the tipping fee involved.

After collection, the waste is taken to a warehouse/plant, which is located close to the receiver of the recycled materials, the gypsum board plant. By having the warehouse/plant next to the receiver of the recycled materials, transportation costs can be kept at a minimum.

When more receivers exist, more warehouses/plants will be established, but they will all be serviced by the same recycling unit. This is only possible due to the unique mobility of the recycling unit. The unit is driven by its own diesel generator and can be dismantled and set up in a few hours. The mobility of the recycling unit allows it to service more recycling plants.

Recycling unit

The recycling unit is specially designed and developed by Gypsum Recycling International and is based on proprietary technology.

The recycling unit from Gypsum Recycling International is very compact and especially takes up limited space in the height; is almost noiseless; leaves virtually no gypsum on the paper backing; creates very little dust during operation and delivers the paper in a very compact form. The compact recycling unit can fit into almost any plant.

The recycling unit has been designed to avoid any waste being landfilled. Therefore the unit is developed to accept all kinds of gypsum waste without any precautions:

Acceptable waste types include:

- Waste from rebuilds;
- Waste from demolition;
- New construction waste;
- Dunnage/underlayers ;
- Production scrap.

Similarly the recycling unit will process waste that is not clean or pure in its form; and even foreign objects that are most often found in demolition waste can be handled:

Acceptable waste materials:

- Virgin gypsum board cut-offs;
- Complete boards or broken parts;
- Gypsum blocks;
- Gypsum ceilings, floors, walls etc.;
- Nails and screws in the gypsum;
- Wallpaper, glass tissue and other wall coverings on the boards.

Finally it is worth noticing that it does not matter whether the gypsum that becomes waste was originally made out of natural raw gypsum or FGD/DSG gypsum.

The recycling unit is equipped with automatic controls and sensors to obtain the most efficient production at maximum safety.

Recycled products

The recycling unit converts the gypsum waste into recycled gypsum powder used for production of new virgin gypsum boards. The paper backing is efficiently separated away from the gypsum core, so there is no paper in the produced gypsum powder; while the paper delivered from the machine is virtually free from gypsum. The paper produced can be used for incineration and other purposes.

By multiple sorting mechanisms all impurities and foreign objects are removed to give a gypsum powder that is very pure. The produced gypsum powder is delivered into two containers for continuous and easy transport to the gypsum board manufacturer close by.

Servicing users

Any recycling system needs users of the recycled materials to work. In other gypsum recycling projects, users outside the industry have been 'chased.' Gypsum Recycling International A/S has never believed in this approach: The natural user of the recycled gypsum materials is the gypsum industry itself, and from an environmental point of view this is also where most value is preserved in the process. Nobody is better capable of using the recycled materials than the industry that produced the virgin materials.

Thus, supplying the recycled gypsum powder back to the industry has

Specially-developed waste container, featuring front flap and hydraulically-operated top lid, for ease of loading.

Waste is unloaded from the container by truck-grab, and subsequently weighed for invoicing purposes.

Global Gypsum

always been the cornerstone of the Scandinavian System and is in full accordance with the 'cradle to grave principle' now adopted in more and more industries.

The recycled gypsum powder is of such high quality that the gypsum industry can use it without taking any special precautions. Since all impurities have been removed, the powder is very pure and can make up to 25% of the materials used in one batch by the gypsum industry. The powder can be mixed with natural raw gypsum as well as FGD/DSG gypsum, while the cost for the gypsum powder is below the cost of virgin natural materials.

Subsidiaries of Knauf and BPB Group are both using the recycled gypsum powder.

The waste pictured above is an example of material that *is* accepted for recycling.

Investment cost - none

As it is obvious from the above, the Scandinavian solution to gypsum recycling offers the gypsum industry a solution where a recycling system can be established by competent people at no cost and without any investments for the gypsum industry.

In order to participate, the gypsum industry should absorb the recycled gypsum powder and thereby gain the following advantages:

- Improved environmental profile and image
- A stable source of high quality materials
- Recycled materials at a price below that of virgin materials

Case study

Recycling in Europe

The Scandinavian solution was first introduced in Denmark in the Autumn of 2001. Since then, the development has been very fast. Today more than 50% of all municipal waste collection and waste transfer stations are covered by the system. In addition several construction and demolition contractors are participating.

Presently more than 30% of the total gypsum waste stream is being recycled and this rate is increasing every month. This continued positive development will ensure that by 2005 - just four years after the start of the scheme - approximately 70% of all gypsum waste will be recycled in Denmark.

The two gypsum board manufacturers in Denmark, Danogips (Knauf) and BPB Gyproc, both participate in the programme. The first recycling plant was established at Hobro (in Northern Jutland), where Danogips is located, while the second plant was established at Kalundborg (on Zealand) where BPB Gyproc is located as well. Both plants are serviced by the same recycling unit.

After the initial success in Denmark, the system has been expanded to cover Norway and Sweden. In Norway, Norgips and BPG Gyproc will receive the recycled materials while BPB Gyproc, Sweden will be receiving materials from Sweden.

Gypsum Recycling International A/S will bring the mobile recycling unit to handle the recycling process at the local plants.

Having established successful Scandinavian operations, Gypsum Recycling International is now offering the system to the rest of Europe, and will in this connection welcome requests from gypsum manufacturing companies as well as from waste collection companies.

Conclusion

Generally the tipping fees/fees for landfilling gypsum waste have been going up everywhere in Europe over the last few years. With new EU legislation coming into effect (directives 31 and 33 from April 1999 and December 2002) classifying gypsum waste as non-inert waste, this development is bound to continue at increasing speed.

This will further increase the attractiveness of the Scandinavian Solution, and will make it obvious to everyone that gypsum waste should not be landfilled, but instead be recycled and reused in the production of new virgin gypsum materials.

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Gypsum produced from the Gypsum Recycling International process is of high purity.

Waste paper from the paper is produced in compact form, and is available for incineration and other uses.