

## FISSAC Living Lab #3, 2017-05-02

### Summary

The third Living Lab meeting on the 2nd of May was conducted in Suez recycling center in Kovik, Stockholm. The aim of the day was to study gypsum/gypsum plasterboard as a common building material with a high recycling potential. The topic of the Living Lab was jointly decided at the previous meeting (Living Lab #2) by the participants and the recycling company SUEZ. The life cycle of the gypsum plasterboards will be discussed also in the following Living Lab meetings #4 and #5.

#### Participants of the Living Lab meeting #3

In total 11 participants: **Pernilla Johansson**, researcher at RISE, Research Institutes of Sweden; **Johan Sidenmark**, NCC; **Tommy Haglund**, business developer at Gyproc; **Merit Kaal**, sustainability consultant at Hifab; **Joa Ivarsson**, leader of the sustainability development at Framtiden Byggutveckling; **Ulf Gustafsson**, sales manager at SUEZ Recycling AB; **Björn Cederlind**, SUEZ Recycling AB; **Magnus Skoglund**, site manager at SUEZ Recycling Kovik; **Linnea Lindkvist**, sustainability consultant at Hifab; **Julia Jonasson**, project manager at RISE; **Kersti Karltorp**, project manager at RISE.

#### Presentations of the day

- Introduction by Linnea Lindkvist (Hifab) (see attached pdf)
- Presentation by Ulf Gustafsson and Magnus Skoglund (SUEZ) about SUEZ and recycling plant in Kovik (Värmdö, Stockholm) (see attached pdf)
- Guided tour at the recycling center by Magnus Skoglund (SUEZ)
- Presentation of the videos about gypsum handling at the construction and demolition site as well as group discussions by Julia Jonasson (RISE) and Linnea Lindkvist (Hifab) (see attached pdf, movies are not included)

#### Highlights of the guided tour

During the Living Lab #3, the participants had a guided tour at SUEZ recycling plant in Kovik. The facility is run privately and serves both private and business customers.

The gypsum waste is left directly by the customers at the designated location at the recycling plant where it is cleaned mechanically from other waste materials. For example, plastic bags or plastic bands that were used to collect and/or transport the gypsum waste. The recycled gypsum is delivered by truck to Knauf in Åhus with whom



SUEZ has a collaboration agreement. Knauf is using recycled gypsum from SUEZ as a raw material in their production of new plasterboards. As an alternative the gypsum waste may be collected by GipsRecycling.



Figure 1: Sorted gypsum waste for recycling

Additionally to the special gypsum waste collection points, it can be seen in a mix of waste that goes for landfilling as well as in the combustion fraction. However, neither landfill nor incineration is an appropriate way to handle the gypsum waste. Magnus Skoglund, SUEZ site manager in Kovik, made a resemblance to gypsum as a "poison". By this he meant that sorted gypsum posed problems in their process, such as low pH in the leachate from the landfill and that the boilers were damaged during combustion. So, in addition to the fact that the material is remarkably suitable for recycling, since it can be used repeatedly without quality deteriorating, there are also other reasons why the plaster should be sorted out.

### **Video session and a group discussion**

Before the Living Lab #3, Hifab and RISE had prepared video material about handling the gypsum plasterboards at a construction site and a demolition site. The video clips

included interviews with a carpenter, construction project manager and a demolition worker. The issues discussed in the videos were following:

- How the material is handled at the workplace
- How the transport and delivery of gypsum plasterboards is done
- How the sorting of gypsum waste is done at the construction site
- How much gypsum waste is generated
- How the gypsum waste is handled after collection by the recycling company
- Is there any alternative for traditional gypsum demolition

After the presentations and the video clips, the groups were discussing the following issues:

**Roles:** Both the carpenter and the demolition worker said that the roles in the construction value chain are firmly delineated. What consequences may that impose on material recycling?

**Economic focus:** We optimize for production when building and a demolition worker does not disassemble. How is the building chain affected by the fact that each link is optimized?

Participants were also asked to give a personal reflection about the day and what new they had learn.

### Summary of the group discussions

#### Reduce the amounts of waste

According to the information shared during the discussions, about 20% of all gypsum used at the construction site becomes spill. In a way that means that every fifth plasterboard is manufactured unnecessarily.

*Design:* design right and order correctly

There is a widespread cost awareness and this along with solid roles may lead to suboptimization and, in the long run, unnecessary material waste.

#### Example:

The material manufacturer can produce custom made plasterboards, but it requires a more specific order. Here the purchasing organization can be an obstacle since they have negotiated prices for specific products and only those are available for purchase. Dimensionally adjusted material becomes a little more expensive in purchasing, but the working time for performing customization is shifted from the construction site to the plasterboard factory, and this probably creates higher efficiency at the construction site.

*Planning of the work:* If the work is done on time it is possible to avoid unnecessary material spills. Digitalization can facilitate planning and avoid collisions.

Example:

The carpenter points to a conflict with other disciplines, such as perforation of already assembled plasterboards to be able to install cables. This will lead to increased amount of waste.

**Knowledge**

The interviewees in the movies gave similar answers to the question of what happened to the plaster after it was thrown - hoping it was recycled, but did not really know. Suez told that they are offering trainings to their customers, which are major construction companies, and expected the level of knowledge to be higher. But according to the interviewed carpenter, it was less important to be careful with materials as plasterboards and therefore producing more waste. Is it possible that knowledge about how the material is recycled may lead to a counter-productive behavior, making it more likely to discard more because the material is still recycled?

**Increased recycling**

Gypsum is 100% recyclable but due to the spills and inefficient waste handling a lot of gypsum is lost in the value chain. Tommy Haglund from Gyproc believes that only about 10% of gypsum waste is recycled today and added that there is a deficit of recycled material. Today, about 25-30% of recycled gypsum is used in the production of new plasterboards, however, it would be possible to make a new plasterboard out of 100% of recycled gypsum.

According to SUEZ, there is no good statistics on how much of the total amount of gypsum received that goes in the wrong fraction, unable to recycle. More information and data about gypsum waste and recycling rates could potentially help to increase the recycling of plasterboards. In addition, good data could help to organize the gypsum waste from the incorrect fractions, landfilling and combustion, to recycling fraction. Therefore, the data is important to know.

In addition, Magnus Skoglund (SUEZ), added that the sorting of the gypsum should be done correctly already at the demolishing/construction site because gypsum is a very porous material that is decomposed to powder during the mechanical handling. Due to that, more spills can occur.

**Opportunities to increase the gypsum recycling:**

- Developed methods for dismantling. Materials development
- Can increased specialization also at demolition be an opportunity for increased recycling? Compare how new construction takes place; one bathroom 11 activities and 8 disciplines. But when it's demolished it's just one discipline.
- Increasing the knowledge about how to use the results of Life Cycle analysis (LCA)

- Using Life Cycle Costing (LCC) helps to consider all costs that will occur during the lifetime of the product, work or service, including end-of-life costs like decommissioning or disposal
- Classifying the recycled gypsum as a raw material? Today the recycled gypsum is sold to the plasterboard companies at no cost.

### **Next Living Lab meetings**

On the next meeting (Living Lab #4) the journey of gypsum plasterboards will continue with a study visit to the manufacturer of gypsum plasterboards, Gyproc. The event is scheduled for Tuesday, June 13th and “save a date” has been sent to all participants.

Examples of question that will be addressed at upcoming meetings:

- Gypsum plasterboards as building material – something that will continue?
- What is required for the material to be classified / equated as raw material?
- How big is actually the environmental impact of gypsum plasterboards?
- Gypsum is a finite resource. How is this addressed by the industry?

The aim of the Living Lab #5, that is scheduled preliminary in September, will be analysing and concluding the main findings of the meetings of Living Labs #3 and #4.