10.6.2025

Workshop 2: Sharing experience and setting the knowledge base

The goal of the second workshop of the project was to share Finnish experience and knowledge base on the cooperation undertaken by the cement and recycling industries as a part of their business strategies. Recycling of composite materials was discussed in a presentation by the Finnish Plastics Industries Federation, which described the development and implementation of the Kimura process. Kuusakoski Recycling Ltd. and Finnsementti explained their part in the recycling pathway.

The presentations provided a comprehensive overview of composite recycling, illustrating how crushed composite material can be used both as a raw material for cement clinker and as an energy source in the process, thereby promoting the circular economy. Following the presentations, the project team had the opportunity to visit Finnsementti, gaining entirely new perspectives on the operations of the cement industry and the scalability of its practices. The key takeaways form the workshop sparked a great interest and new ideas among the participants, leading to comprehensive discussions that supported the advancement of the project.

Finnish Plastics Industries Federation: Kimura process

The Kimura process is an efficient system developed in Finland for recycling composite waste, which has attracted international interest. In the process composite waste, such as wind turbine blades, boats, and industrial production waste, is collected, crushed using specialised equipment, and utilised by the cement industry. The waste serves as a raw material for cement clinker, with the glass fibre replacing limestone, and as a fuel, substituting fossil fuels used in the process. This prevents the generation of difficult-to-manage waste, which would otherwise be inevitable through incineration, for example.

The development of the Kimura process was initiated by the industry in 2021 in collaboration with the Finnish Ministry of the Environment. Since 2022, it has operated independently without public funding. Although the recycled volumes have so far been modest (approximately 2,000 tonnes in 2024), the model is scalable and offers a solution particularly for the reuse of difficult-to-recycle, fibre-reinforced composites. Finland’s key success factors include efficient logistics, close collaboration within the network, short distances, and Kuusakoski’s specialised processing facility. However, challenges remain, such as the low awareness among end-users about the composite nature of their products. Campaigns and training are being used to address this issue.

Kuusakoski Recycling Ltd

Kuusakoski is a family-owned recycling company that has been operating for over 110 years. The company has approximately 1000 employees in five different countries, with its main focus in Finland. Kuusakoski processes around 900,000 tonnes of recycled materials annually, around 80% of which are metals, but composite and electronic waste is also recycled. Composite materials are particularly interesting from a recycling perspective due to its versatile and growing volume of waste, especially as waste from the manufacturing industry and the renewable energy sector (e.g. wind turbine blades).

Kuusakoski has responded to the challenges of composite waste recycling by constructing an industrial-scale recycling facility in Hyvinkää, capable of processing up to 6,000 tonnes of composite waste per year. The process begins with pre-treatment at the worksite, where materials are cut down for transport, and continues at the facility with a precise crushing and separation process, which includes the removal of metals using magnetic separators. The end product is carefully specified, such as crushed material under 50 mm in size, which is then delivered to the cement industry. As previously mentioned, composite waste can replace both fossil fuels and limestone in cement production, helping to reduce the carbon footprint.

The Kuusakoski's solution for recycling composite materials provides an environmentally friendlier alternative for traditional landfill and energy recovery methods, promoting the circular economy, reducing the use of natural resources, and supporting sustainable growth. The company continuously develops its processes and seeks new, economically and environmentally viable ways to utilise recycled materials.

Finnsementti Ltd.

Finnsementti is a cement industry company operating in Eastern Finland and is part of an Irish-owned group. The company has traditionally developed through the merger of national firms, and today it plays a significant role in promoting sustainability and the circular economy in cement production.

Finnsementti's plant, which began operations in 2007, processes approximately 1,600 to 1,900 tonnes of material per day. Cement production increasingly makes use of industrial by-products and alternative fuels to replace fossil fuels. The use of composite waste in cement manufacturing takes place through co-processing, where the waste is incinerated at high temperatures (over 1,400 °C) in a clinker kiln.

Photo 1 Preheating system

An advantage of co-processing is that the glass fibre in the composite material melts into the raw material of the clinker, leaving no glass fibre residues in the cement. This process allows recycled materials to be used efficiently and in an environmentally friendly way.

The plant has strict quality and material limits, and waste types that do not meet these standards cannot be used. The amount of composite waste in Finland is still small, but efforts are being made to increase its utilisation. Challenges include the dryness, cleanliness, and composition of the waste, as well as the optimal quantity, to ensure that the cement production process is not adversely affected.

Finnsementti continually strives to develop its recipes and technologies to better utilise a variety of recycled materials. Overall, co-processing is seen as a significant part of the transition towards carbon-neutral cement production and sustainable construction.

Company visit

After the presentations, we had the opportunity to tour Finnsementti's plant in Lappeenranta. The factory is located very close to the city centre, where we travelled from the event venue. At the factory gates, Finnsementti staff were waiting for us and guided us through the safety procedures while we put on the appropriate protective equipment. Afterwards, we proceeded on a guided tour of the factory premises.

One of the objectives of the company visit was to gain an understanding of how the circular economy is applied across various industrial sectors, which we experienced firsthand through the process. Composite waste is fed into the process as part of Secondary Recycled Fuel (SRF). The plastic content in the composite alone is not sufficient, so SRF from other sources is also added. The additional fuel is used together with the raw materials, allowing the co-processing method to deliver multiple benefits within the process. Preventing waste generation and preparing materials for reuse are important parts of the overall production, which was evident during the waste collection and shredding stages. The ready-to-use SRF was stored on-site and fed into the process according to precise procedures. The process itself was highly automated and monitored by professional staff from control rooms. During the visit, we had

Photo 2 Group photo of the project group

the opportunity to see the control room and learn about its operations. On the factory tour, we also visited the preheating system and the massive cement kiln, which illustrated the scale of the cement industry.

Our visit concluded with an open discussion session, after which we took a group photo to commemorate the occasion. Overall, the visit was highly rewarding, and the professional staff engaged actively with the tour, presentations, and discussions, providing insightful and well-informed responses throughout.