

Ostrobothnian and Southern Ostrobothnian Construction Companies' Views on Circular Economy, Sustainability and Material Recirculation and Reuse

*Based on a survey study by the project
Circular Economy – A Game Changer for the Wood Building Industry*

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1. Introduction

Circular economy is a concept that keeps on gaining in popularity as the society searches for new ways to shift towards more green and sustainable solutions. In short, the core concept of the circular economy is to move from a traditional, linear concept of taking – making – using – disposing to a system where resources and materials stay in the loop as long as possible, being recirculated and reused as long as possible before being recycled. The circular economy hence aims to prolong the lifecycles of products and materials in order for them to retain their value as long as possible.

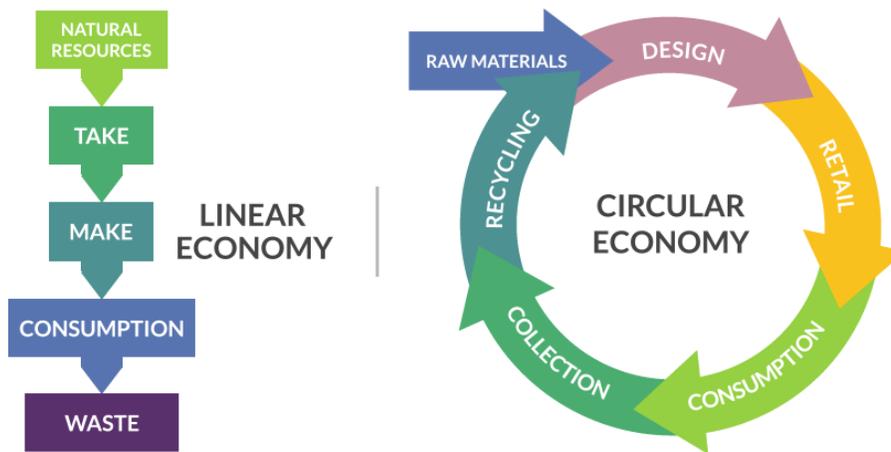


Figure 1. Processes of the linear vs. the circular economy.
Picture source: The End of Waste Foundation, <https://endofwaste.com/individuals>

According to the Finnish Ministry of Environment, the construction sector uses about 50 % of the world’s natural resources, contributes to 35 % of all the global greenhouse gas emissions and produces 30 % of all the waste.¹ The importance of the construction industry can hence not be neglected when working with meeting national and international sustainability and climate goals.

1.1. The project Circular Economy – A Gamechanger for the Wood Building Industry

This report is written within the project *Circular Economy – A game changer for the wood building industry*, a project funded by Botnia-Atlantica and the Regional Council of Ostrobothnia that was active between 2018 – 2021. The project partners consisted of Novia University of Applied Sciences,

¹ <https://ym.fi/en/circular-economy-in-the-construction-sector>, accessed 17.6.2021

Seinäjoki University of Applied Sciences, Tampere University as well as Umeå University, and the goal of the project was to increase small and medium-sized building companies' knowledge when it came to circular economy as well as to support and help the companies overcome common barriers in their adaptation to more circular economy processes and solutions.

1.2. The survey study

As a part of the project's work with investigating how to extend the lifecycles of existing buildings, a survey study was carried out. The questionnaire study was conducted in 2020 – 2021, and the goal was to map the situation, attitudes and thoughts of the region's construction companies when it comes circular economy and sustainability, as well as to better understand the material flows of the companies.

The target group was small and medium sized companies (SMEs) as well as micro companies in the construction and renovation field within the Finnish Botnia-Atlantica area (see figure 2), and as the questionnaire was an online survey, the link was sent out to all relevant companies with an email address listed in the regional company and service- registers. The questionnaire could be answered in both Swedish and Finnish, and in total, 19 respondents from Ostrobothnia and 4 from Southern Ostrobothnia partook in the study.



Figure 2. The target group for the survey was located within the Finnish Botnia-Atlantica area (Ostrobothnia, Southern Ostrobothnia and Central Ostrobothnia)

The questionnaire was divided into six main parts:

- Background questions
- Customer needs, logistics and supply chains
- Material circulation and sustainable building
- Residual materials and re-use
- Other
- Gender equality

and consisted of both open questions and questions asking the companies to rate their experiences on a four- or five-graded scale. In this report, the answers from the first four parts will be presented,

whereas the questions on gender equality can be found in a separate project report on gender equality within the wood building industry.

Due to the limited number of respondents, too big conclusions can't be drawn from this study. Bearing this in mind, however, the study manages well in providing a valuable message from the industry in regard to how they experience the situation and gives the micro and small building companies a possibility to share their observations and experiences from within the field.

2. Presentation of questionnaire results

In the following, the results of the survey will be presented, section for section.

In order to ensure the anonymity of the responding companies, the answers from the Ostrobothnian companies (19) and the Southern Ostrobothnian (4) are presented together.



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2.1. Background questions

The background questions consisted of both open questions and multiple answer questions. The open questions have been categorized in order to make the results more comprehensible.

Number of employees:

	Frequency	Percentage
Micro companies (1 – 9 employees)	13	59 %
Small companies (10 – 49 employees)	9	41 %
Medium companies (50 – 249 employees)	0	0 %

Out of which women:

	Frequency	Percentage
0 %	14	64 %
1 – 10 %	6	27 %
11 – 20 %	1	5 %
50 %	1	5 %

Area of Business:

	Frequency	Percentage
The own municipality	13	59 %
Two or more municipalities	4	18 %
Ostrobothnia	4	18 %
The whole Country	1	5 %

Turnover:

	Frequency	Percentage
< 2 million euro	17	74 %
2 – 10 million euro	6	26 %
10 – 50 million euro	0	0 %
> 50 million	0	0 %

Our company:

(possible to select several options)

	Frequency	Percentage
Builds new	16	70 %
Renovates	19	83 %
Demolishes	9	39 %
Building maintenance	6	26 %
Subcontractor to the building industry	13	57 %
Other: Consultancy work	1	4 %

Do you hire subcontractors for special tasks (eg. electricians, floor layers)

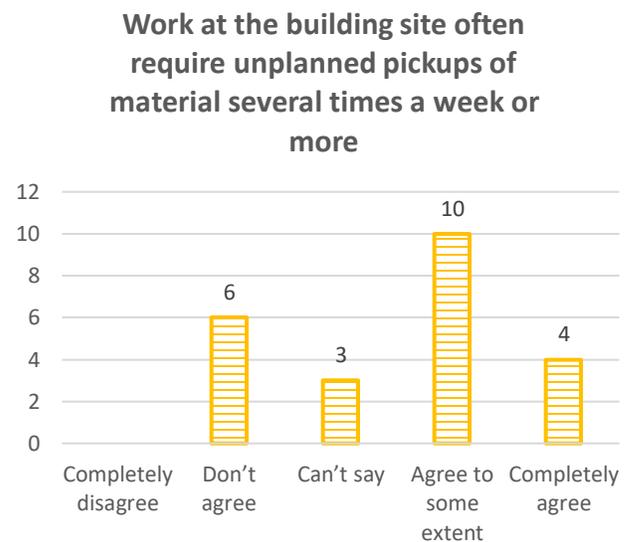
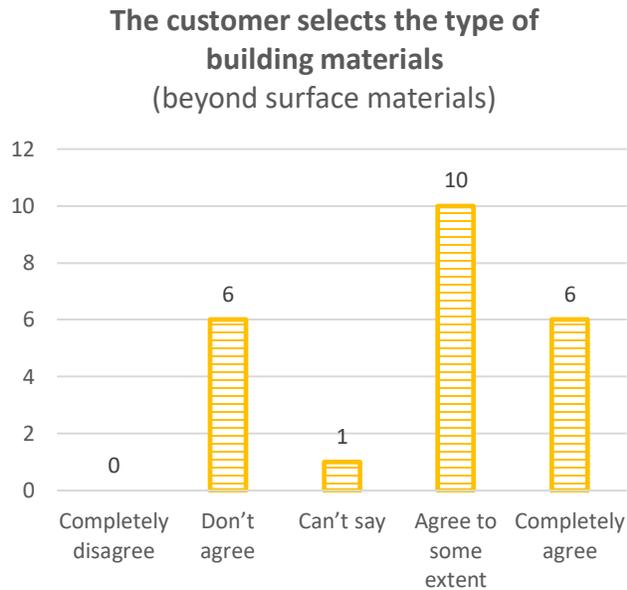
	Frequency	Percentage
Yes	17	74 %
No	2	9 %
Sometimes	4	17 %

As can be seen from the tables, the responding companies were micro and small companies (both in regard to employees and turnover) with activities mainly in their own municipalities.

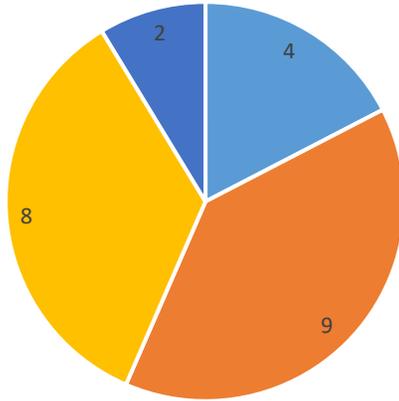
21 out of the 23 companies had activities in several subfields, with renovating and building new being the most popular. The vast majority of the companies did hire subcontractors.

2.2. Customer needs, logistics and supply chains

In this section, the respondents selected to what degree they agreed with the different statements on a five-graded scale, from 1 = completely disagree to 5 = completely agrees. The section was concluded with an open question.

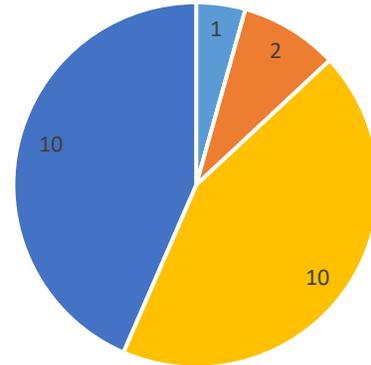


We usually get the building materials from only one main supplier / retailer



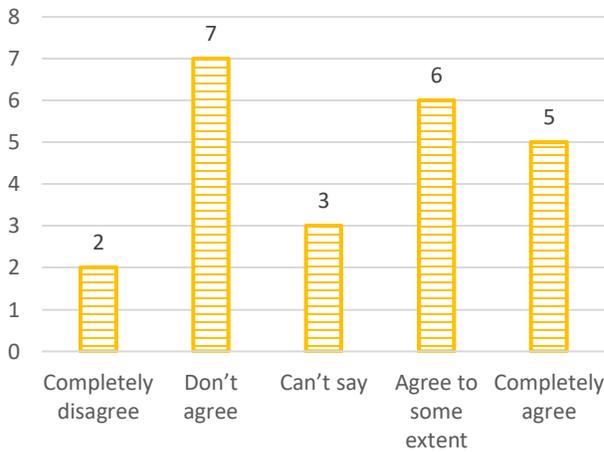
■ Completely disagree ■ Don't agree
■ Can't say ■ Agree to some extent
■ Completely agree

Our company has the possibility to order material / communicate with the supplier digitally



■ Completely disagree ■ Don't agree
■ Can't say ■ Agree to some extent
■ Completely agree

It would be good to get all the building material as a single delivery to the building site



If not, what are the constraints?

- Lack of storage (4 respondents)
- Lack of storage + other reasons:
 - o The material comes from several suppliers (3)
 - o Economic reasons (1) and freight costs (1)
- Different materials are needed at different times at the site (1)
- The material would have to be moved several times, which makes it subject to damage and breaking. Other risks associated with storing material for longer periods (1)
- Difficult to do as of the moisture safety plans

When analyzing the answers, it was evident that most companies agreed with it being the customers that selected the building materials, however, the companies' views ranged a lot when it came to whether the customers often asked for ecological materials or otherwise more sustainable materials or not. The companies, however, rated their own interest in the origin of the building materials and interior goods highly.

The building materials way to the work site was further investigated, and it could be seen that most of the companies disagreed and strongly disagreed to the claim of using only a main supplier or retailer for the materials. The vast majority also had the possibility to digitally communicate and order material with the retailer.

When it comes to unforeseen and unplanned material pickups, a majority of the companies agreed to unplanned pickups of material occurring several times a week or more, however, even though there was a slight overweight in the agreeing with it being good to get all materials in one delivery, the companies provided several important reasons for it not being feasible in all cases. Among the most common constraints, lack of storage, material coming from many suppliers and economical reasons were mentioned. Furthermore, moving around material makes it subject to wear, damage and breaking and it is not always possible due to the moisture safety plans.



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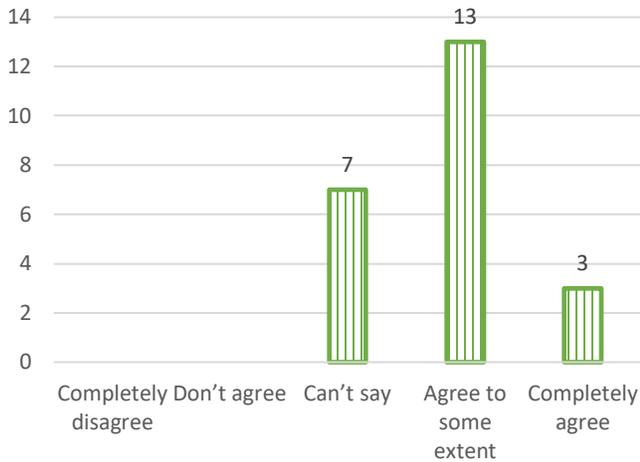
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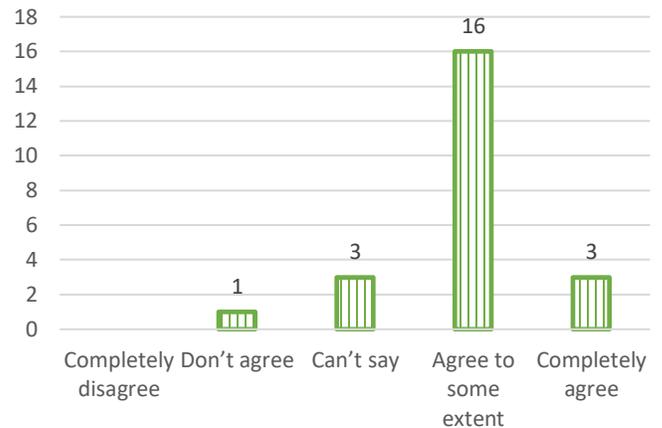
2.3. Material circulation and sustainable building

Similarly to the previous section, the questions on material circulation and sustainable building let the respondents select their answer on a five-graded scale, from 1 = completely disagree to 5 = completely agrees. The section also included an open question.

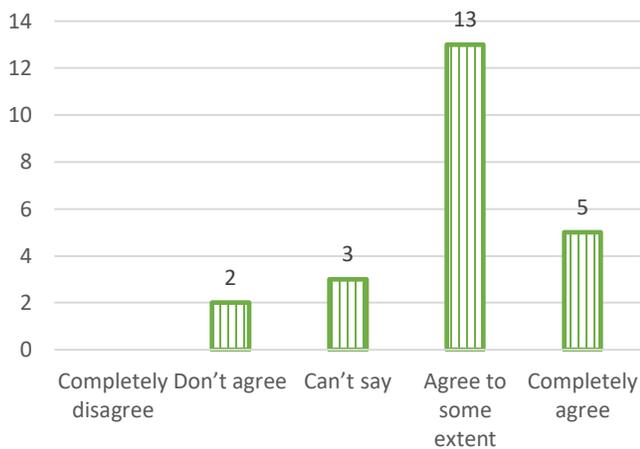
Our company is interested in using recycled building material



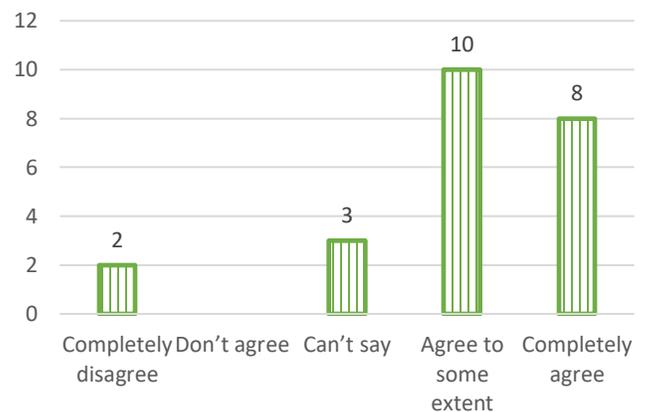
Material selection (construction / interior design) for good sustainability takes place mainly already in the planning process / design process



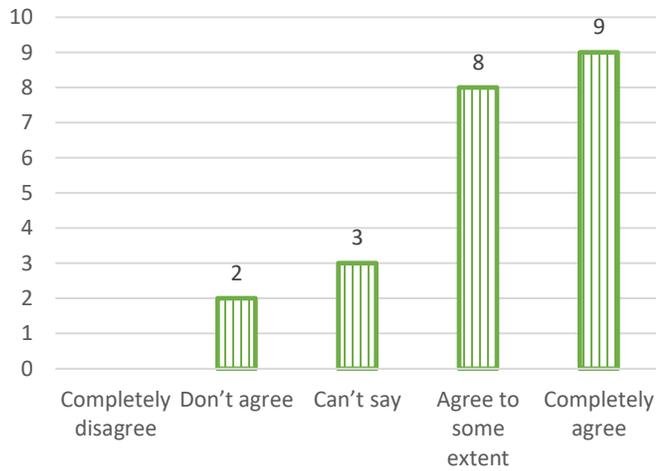
Our company is interested in using materials and assembly methods that enables later reuse



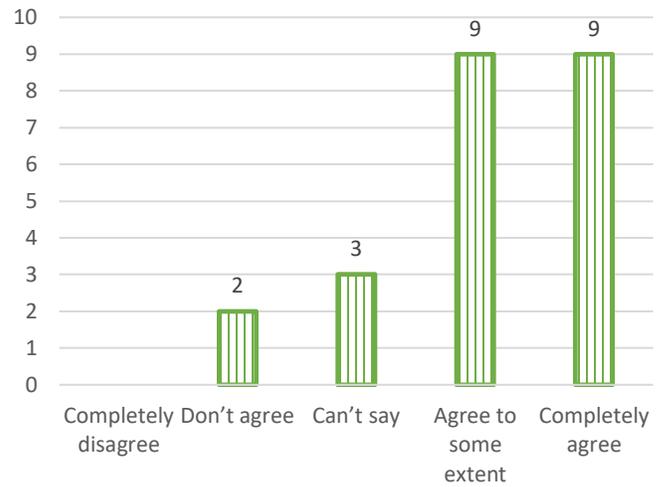
Our company is interested in if the building material / interior goods are environmentally friendly



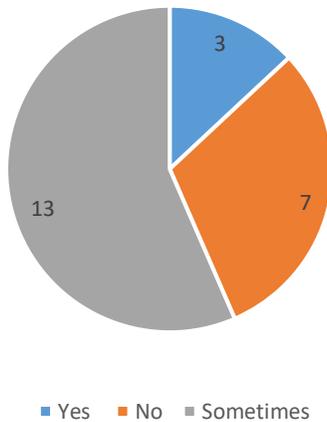
Our company strives to decrease the environmental impact of our work processes



The building industry has the potential to adapt to a circular economy



Is residual material / leftover material often left at the customer (by agreement)?



Do you have your own suggestions for new working methods that simplify disassembly?

- Having a more homogenic frame (1)
- Education on how to handle waste (1)
- Develop methods for attachment, assembly

Using recycled material as well as material and assembly methods that enables later reuse were both topics the majority of the respondents were optimistic too, and a great majority of the respondents agreed to the importance of the planning and design process when it comes to material selection for good sustainability.

The responding companies were interested in if the environmental friendliness of the materials and goods, and a majority of the companies agreed to striving to decrease the environmental impact of their processes. They were also agreeing with the building industry having the potential to adapt to a circular economy.



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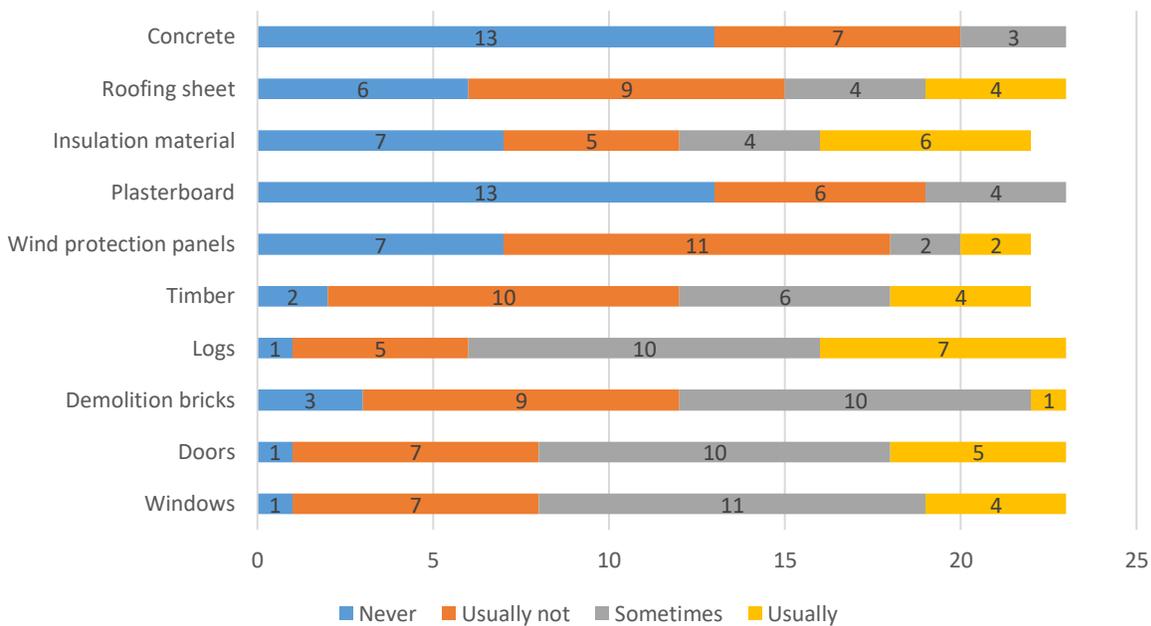
2.4. Residual materials and re-use

Having traced the virgin material streams, the following section was focused on the usability of the existing materials streams. The questions consisted of rating different materials on a four or five-graded scale as well as several open questions.

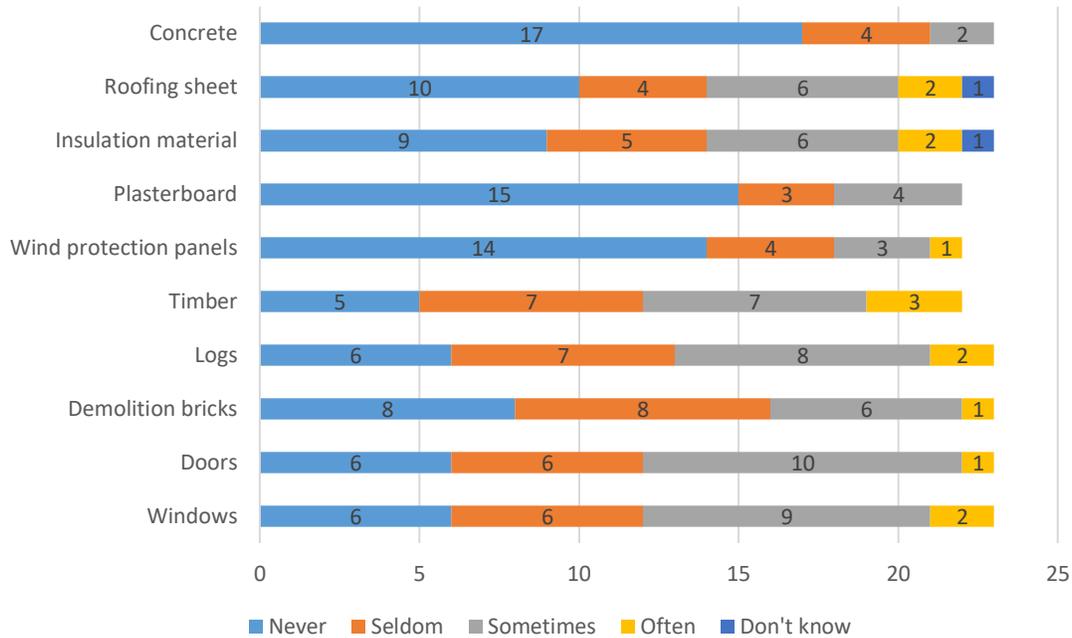
In our company, we use residual material that arises during a construction / renovation



During demolition work, how often are the following materials in good enough condition to be reused?



In our company, the following recycled products are used in new construction or renovation



In this section, different building materials were analyzed, and it could be seen that many companies do reuse the residual materials arising during the construction or renovation work.

When it comes to material conditions being good enough to be reused for materials in the demolition work, it was seen that windows, doors and logs are the groups that most often are in good shape enough to be used, whereas concrete and plasterboards are on the opposite end of reusability.

Regarding whether the companies used recycled products in their new construction and renovation works, the situation was the best for windows, doors, logs and timber.

What do you think could be done to make buildings last longer?

- Taking better care of the building (4) and investing in installations that are easy to maintain and change. Better facade material (1)
- Use more sustainable and recyclable materials (1), better materials (1), better material selection (1), prohibit plastics (1)
- New materials should be tested more among themselves to be able to determine how durable they are in the long run
- Better moisture safety thinking and longer timetables
- Closer monitoring during the construction phase
- It is possible to build good houses that last a long time, but no normal person would be able to afford to build a really sustainable house

What do you think could be done to minimize construction waste?

- Better planning (2), better planning and calculating of quantities (2), more accurate orders (1), counting tighter and rather buying more materials if needed (1), taking material sizes into account in the planning (1)
- Good planning and a sufficiently large selection of different lengths of material means that the waste is almost neglected.
- More standardization, there is too much customization today
- More accurate sorting and more recycling (2), possibility to recycle insulation (1)
- Changes in drawings often come too late. We try to use materials that have been changed on another project, which is going quite well.

What do you think is required for an increase in the circular economy in the construction industry?

- Economic incentives / aid (2), increases in material costs or waste fees (1)
- Someone should make a business out of it (1), accessibility to selling place of recycled, recovered building parts (1)
- Interest from the customer to accept various proposals together with planners
- Taking circular economy into account already in the planning stage.
- Legislative change so that you have the right to use old material (1)
- Requirements on more precise sorting. Encouragement to use more sustainable materials. (1)
- That industry people coming together, arranging courses (1), knowledge (1)

3. Conclusions and recommendations

From the questionnaire, it was seen that the companies were optimistic to circular economy and using recycled material as well as material and assembly methods that enables later reuse. The planning and design processes were considered to be important when it comes to material selection for good sustainability, and it was further lifted up and emphasized by the companies when asked for how the construction waste could be minimized. Better planning and better calculating hinder leftovers to arise in the first place, and this can be further aided by taking material sizes into account in the planning and to better utilize residual materials from other projects.

In order for the industry to move towards circularity, the companies lift up both economic incentives, increased accessibility to reused materials as well as legislation allowing for the reuse, but also more interest from the customers to accept proposals by the planners. The extent to which the companies see the customers asking for ecological materials or material with certain requirements to environment or health varies, but as most of the companies agree to that the customers select the type of building materials, the customers role in a transition to more circular solutions can not be neglected.

Although many of the responding companies in general had environmentally friendly and positive attitudes to sustainability and circular economy, it is important to keep in mind that these are the companies that also might be the most likely to also answer a questionnaire about it. To give a more objective picture of the situation, further studies are hence needed.