

Reuse of cast-in-place concrete in load bearing structures - questionnaire

Oppdatert: 25. mai 2023 kl. 19:23

1. Background information

1.1. What is your age?

- 37
- 39
- 49
- 28
- 40
- 57

1.2. What is your gender?

Antall svar: 6

Svar	Antall	% av svar	
Prefer not to respond	0	0%	0%
Other	0	0%	0%
Male	5	83.3%	83.3%
Female	1	16.7%	16.7%

1.3. What country are you employed in?

Antall svar: 6

Svar	Antall	% av svar	
Other:	1	16.7%	16.7%
Norway	5	83.3%	83.3%

1.3.1. If other, what country is this?

- Canada

1.4. What is your role in the planning process of a project?

Antall svar: 6

Svar	Antall	% av svar	
Other:	0	0%	0%
Sub contractor	0	0%	0%
Main contractor	0	0%	0%
Material sourcing	1	16.7%	<div></div> 16.7%
Demolition	0	0%	0%
Finances	0	0%	0%
Logistics	0	0%	0%
Quantity surveyor	1	16.7%	<div></div> 16.7%
Structural analysis	2	33.3%	<div></div> 33.3%
Design	6	100%	<div></div> 100%
Client	1	16.7%	<div></div> 16.7%

1.4.1. If other, what role is this?

1.5. What type of structures have you been involved with?

Antall svar: 6

Svar	Antall	% av svar	
Other:	0	0%	0%
Landscaping	1	16.7%	<div></div> 16.7%
Infrastructure	2	33.3%	<div></div> 33.3%
Buildings over 5 floors	2	33.3%	<div></div> 33.3%
Buildings under 5 floors	5	83.3%	<div></div> 83.3%

1.5.1. If buildings under or over five floors, what type of buildings were these?

Antall svar: 6

Svar	Antall	% av svar	
Mixed use	3	50%	<div></div> 50%
Residential	5	83.3%	<div></div> 83.3%
Commercial	4	66.7%	<div></div> 66.7%

1.5.2. If infrastructure, what type of structures were these?

Antall svar: 2

Svar	Antall	% av svar	
Large scale public works (sewers, water conduits etc.)	1	50%	<div></div> 50%
Roads	0	0%	<div></div> 0%
Bridges	1	50%	<div></div> 50%

1.5.3. If other, what type of structure was this?

1.6. Have you worked with reuse of building materials in a new site before?

Antall svar: 6

Svar	Antall	% av svar	
No	6	100%	<div></div> 100%
Yes, but not in load bearing structures	0	0%	<div></div> 0%
Yes, in load bearing structures	0	0%	<div></div> 0%

1.6.1. If in load bearing structures, what materials did you reuse?

Antall svar: 0

Svar	Antall	% av svar	
Other:	0	0%	<div></div> 0%
Brick	0	0%	<div></div> 0%
Concrete	0	0%	<div></div> 0%
Steel	0	0%	<div></div> 0%
Wood	0	0%	<div></div> 0%

1.6.2. If other, what components or materials did you reuse?

2. Concrete as a building material

2.1. With current regulations, to what degree do you see the emissions from the use of concrete as a limiting factor in the planning process of a project?

Antall svar: 6 Snitt: 2.50 Median: 2.5

Svar	Antall	% av svar	
5	0	0%	0%
4	1	16.7%	<div></div> 16.7%
3	2	33.3%	<div></div> 33.3%
2	2	33.3%	<div></div> 33.3%
1	1	16.7%	<div></div> 16.7%

2.2. To what degree do you believe new cast-in-place concrete will be used in the sustainable building industry of the future?

Antall svar: 6 Snitt: 3.17 Median: 4

Svar	Antall	% av svar	
5	0	0%	0%
4	4	66.7%	<div></div> 66.7%
3	0	0%	0%
2	1	16.7%	<div></div> 16.7%
1	1	16.7%	<div></div> 16.7%

2.3. If you have any additional comments on concrete as a building material, please share them below:

- Concrete will always have its place in construction, perhaps not as much in the superstructure component, but the foundation elements do appear to have viable alternatives to concrete at this stage.

3. Reuse of building materials

3.1. How do you perceive the building industry's view on reuse of building materials today?

Antall svar: 6 Snitt: 2.83 Median: 2.5

Svar	Antall	% av svar	
5	1	16.7%	<div></div> 16.7%
4	0	0%	<div></div> 0%
3	2	33.3%	<div></div> 33.3%
2	3	50%	<div></div> 50%
1	0	0%	<div></div> 0%

3.2. How do you think the efficiency of planning/building with reused materials will compare to planning/building with virgin materials in the future?

Antall svar: 6 Snitt: 3.17 Median: 3.5

Svar	Antall	% av svar	
5	0	0%	<div></div> 0%
4	3	50%	<div></div> 50%
3	2	33.3%	<div></div> 33.3%
2	0	0%	<div></div> 0%
1	1	16.7%	<div></div> 16.7%

Imagine a scenario where a system for buying and selling used building components exists and is actively used in the building industry. The components are gathered at a local storage facility and are sold with all necessary documentation ready for use.

3.3. To what degree would this change the amount of reused building components you include in your projects?

Antall svar: 6 Snitt: 3.67 Median: 4

Svar	Antall	% av svar	
5	2	33.3%	<div></div> 33.3%
4	2	33.3%	<div></div> 33.3%
3	1	16.7%	<div></div> 16.7%
2	0	0%	<div></div> 0%
1	1	16.7%	<div></div> 16.7%

3.4. Who should be financially responsible for providing such a system?

Antall svar: 6

Svar	Antall	% av svar	
Shared between the above	5	83.3%	<div></div> 83.3%
Planners	0	0%	<div></div> 0%
Contractors	0	0%	<div></div> 0%
Public organ	1	16.7%	<div></div> 16.7%

3.5. If you can think of another solutions to the challenge of sourcing used materials, please share them below:

- Decentralised material mapping could be a solution.

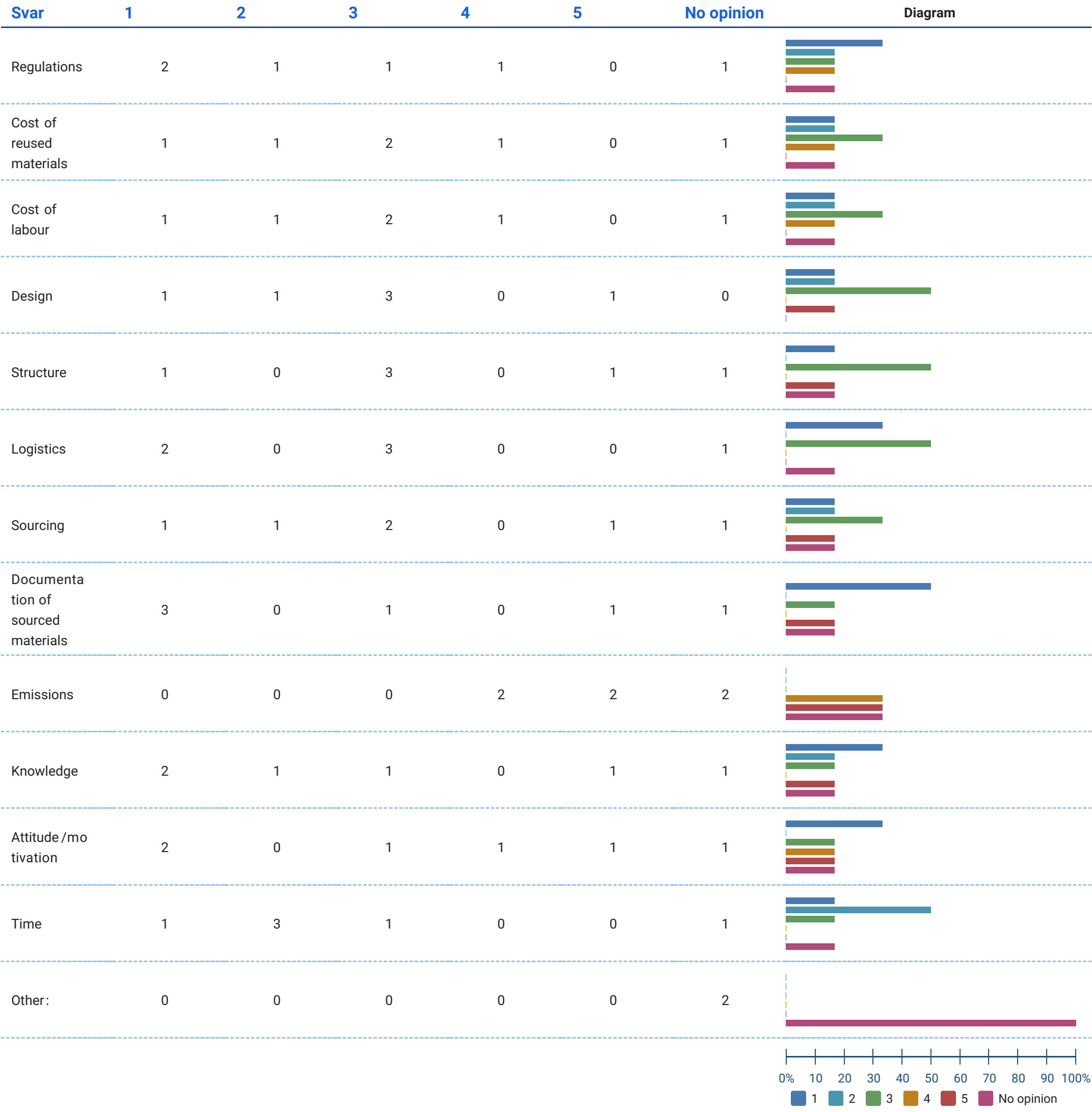
4. Reuse of RC (cast-in-place concrete in load bearing structures)

4.1. To what degree do you see reuse of RC as feasible in today's building industry?

Antall svar: 6 Snitt: 2.33 Median: 2

Svar	Antall	% av svar	
5	0	0%	<div></div> 0%
4	0	0%	<div></div> 0%
3	2	33.3%	<div></div> 33.3%
2	4	66.7%	<div></div> 66.7%
1	0	0%	<div></div> 0%

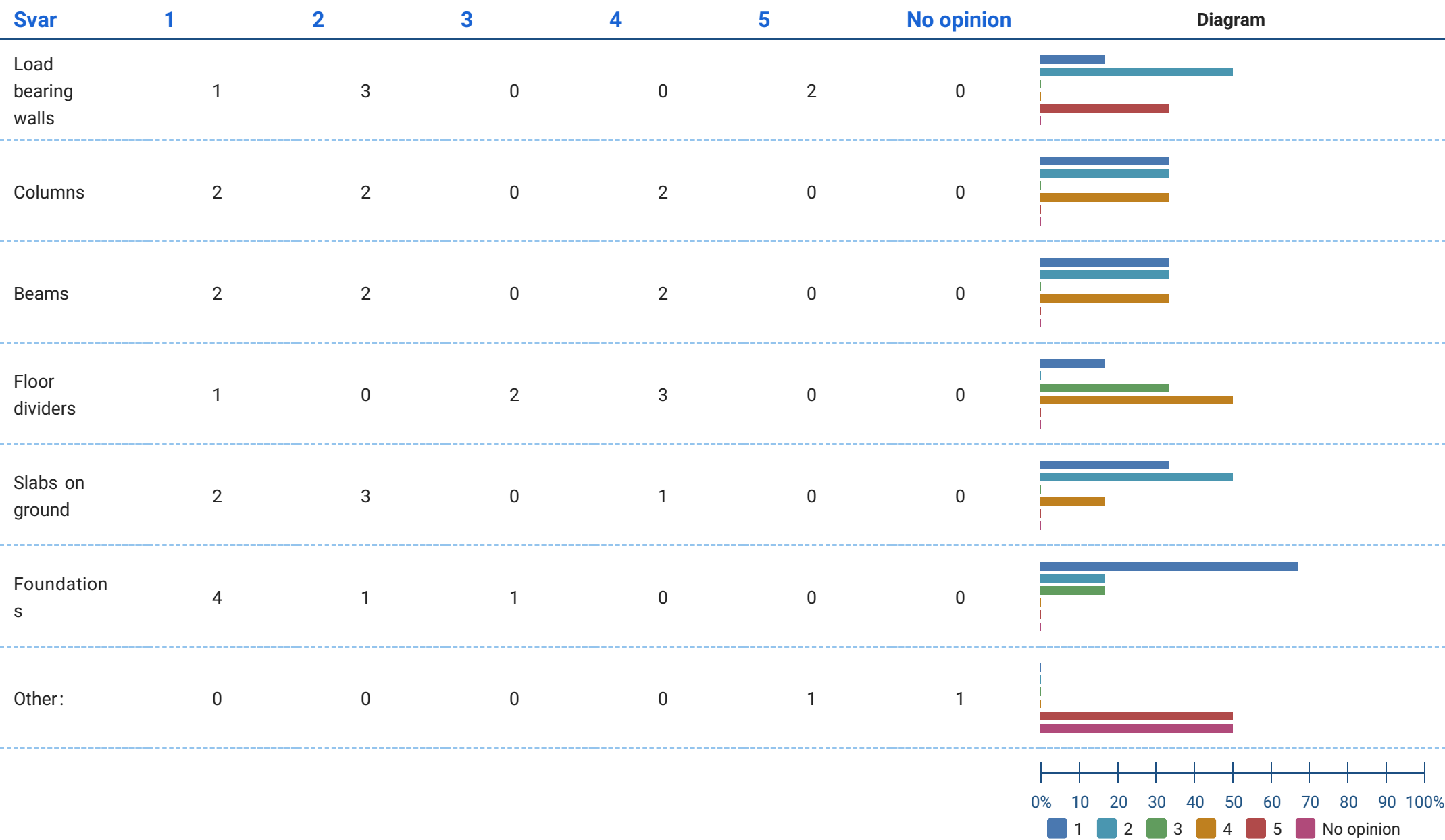
4.2. As of today, to what extent do you see barriers (1) and drivers (5) in the following categories for the reuse of RC?



4.2.1. If other, what barriers and/or drivers would this be, and how would you range them on a scale from 1 to 5?

- Successful use cases, 1
- sustainability certification / financial subsidies for reuse
- Collective thinking is (4), integration of digital tools (2)

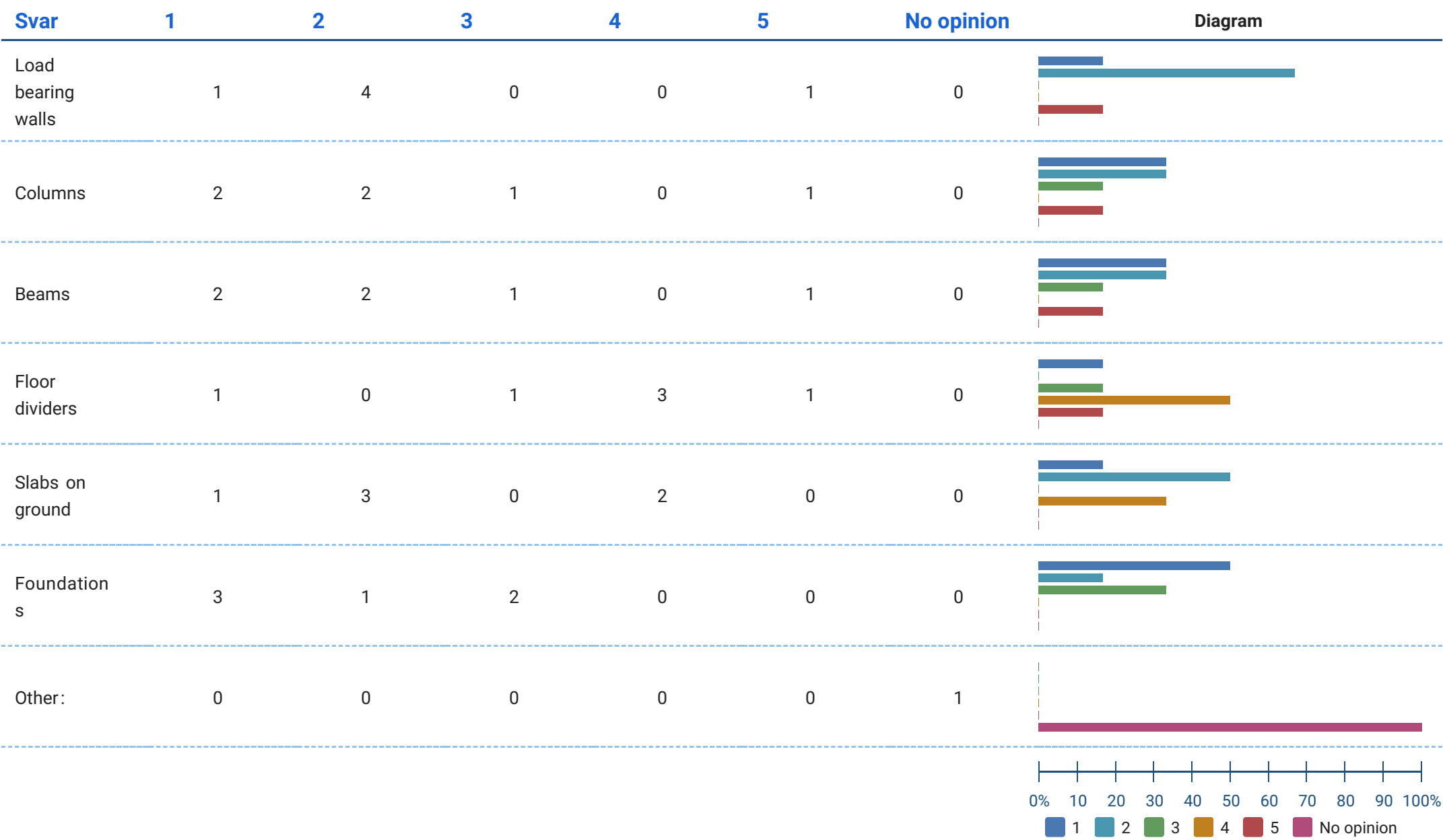
4.3. How would the following RC elements be suited for reuse regardless of end-use?



4.3.1. If other, what building element would this be, and how would you range it on a scale from 1 to 5?

- precast balconies
- Retaining wall in cores (4)

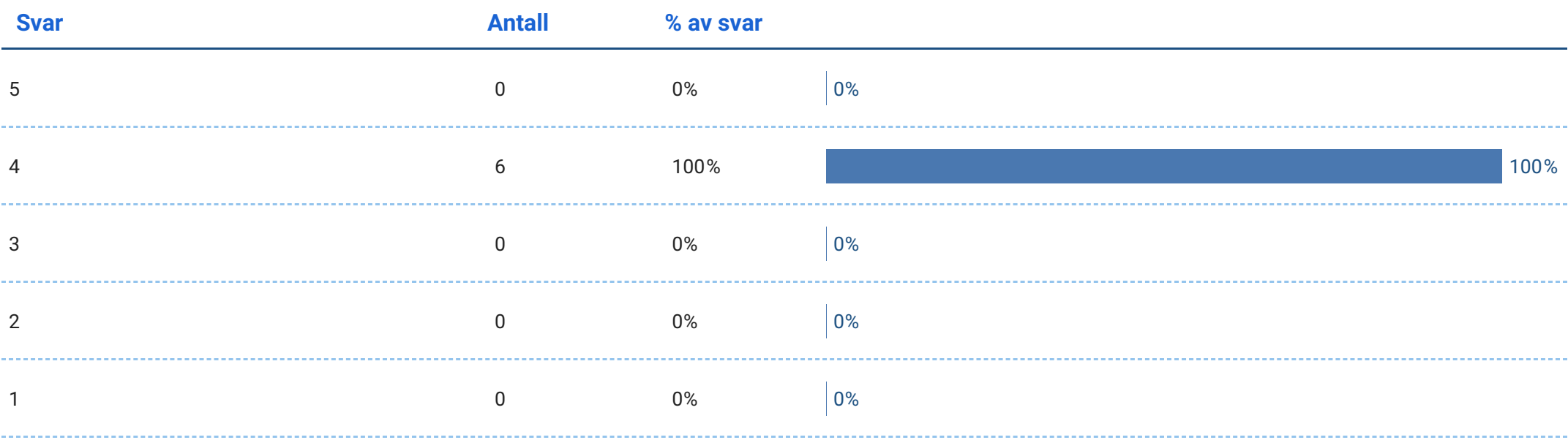
4.4. How would the following RC elements be suited for reuse, where the end-use is the same as initially intended use?



4.4.1. If other, what building element would this be, and how would you range it on a scale from 1 to 5?

4.5. If you are paying attention to the questionnaire, please choose the option four on the linear scale.

Antall svar: 6 Snitt: 4.00 Median: 4



4.6. What would be the expected average price of a reused component compared to new RC?

Antall svar: 6

Svar	Antall	% av svar	
Significantly higher (150-%)	2	33.3 %	<div></div> 33.3 %
Higher (-150%)	2	33.3 %	<div></div> 33.3 %
Equal	1	16.7 %	<div></div> 16.7 %
Lower	1	16.7 %	<div></div> 16.7 %

4.7. What would be an acceptable average price of a reused component compared to new RC?

Antall svar: 6

Svar	Antall	% av svar	
Significantly higher (150-%)	0	0%	<div></div> 0%
Higher (-150%)	1	16.7 %	<div></div> 16.7 %
Equal	4	66.7 %	<div></div> 66.7 %
Lower	1	16.7 %	<div></div> 16.7 %

4.8. How would the collaboration between client, architects, engineers, and contractors change in a planning phase where reused RC is being used?

- Up front planning of exact use cases would be critical. Design changes could be very detrimental to the viability of re-use.
- No change
- Closer collaboration on material choice
- They will have to consider the material condition and what potential it has and start thinking around their properties.
- The comunication and clarification/documentation about the production, costs and design of reused RC has to increase.
- Not at all

4.9. What information about the RC that is to be reused would be necessary for you to do your part of the planning process in a project?

- Documentation of original design and also documentation of successful construction/installation.

- All properties

- Well-defined properties of the reused component

- The dimensions would be critical to know.

- Documentation

- None - not my problem

4.10. If you have additional thoughts and oppinions on reuse of RC, please share them below:

- There is potentially additional risk borne by the designer in re-using another design's capacity, as well as another contractor's quality. The risk would be priced into the project or attempted to be offloaded to another entity. There appear to be very few straight lines on where liability begins and truly ends without taking on added risk. Site construction of concrete elements are also generally of less quality than precast or plant constructed elements, which may limit the re-use case and/or work against the preference to re-use elements.

- For the question 4.6 and 4.7, I answered based on cast-in-place concrete. My initial thoughts were that a cast-in-place concrete is becoming a pre-cast for secondary use. There will be extra cost in maintaining and preparing the cast-in-place say transport to a facility and transport back to the new building.

- I have no idea how you propose to reuse in situ concrete components
