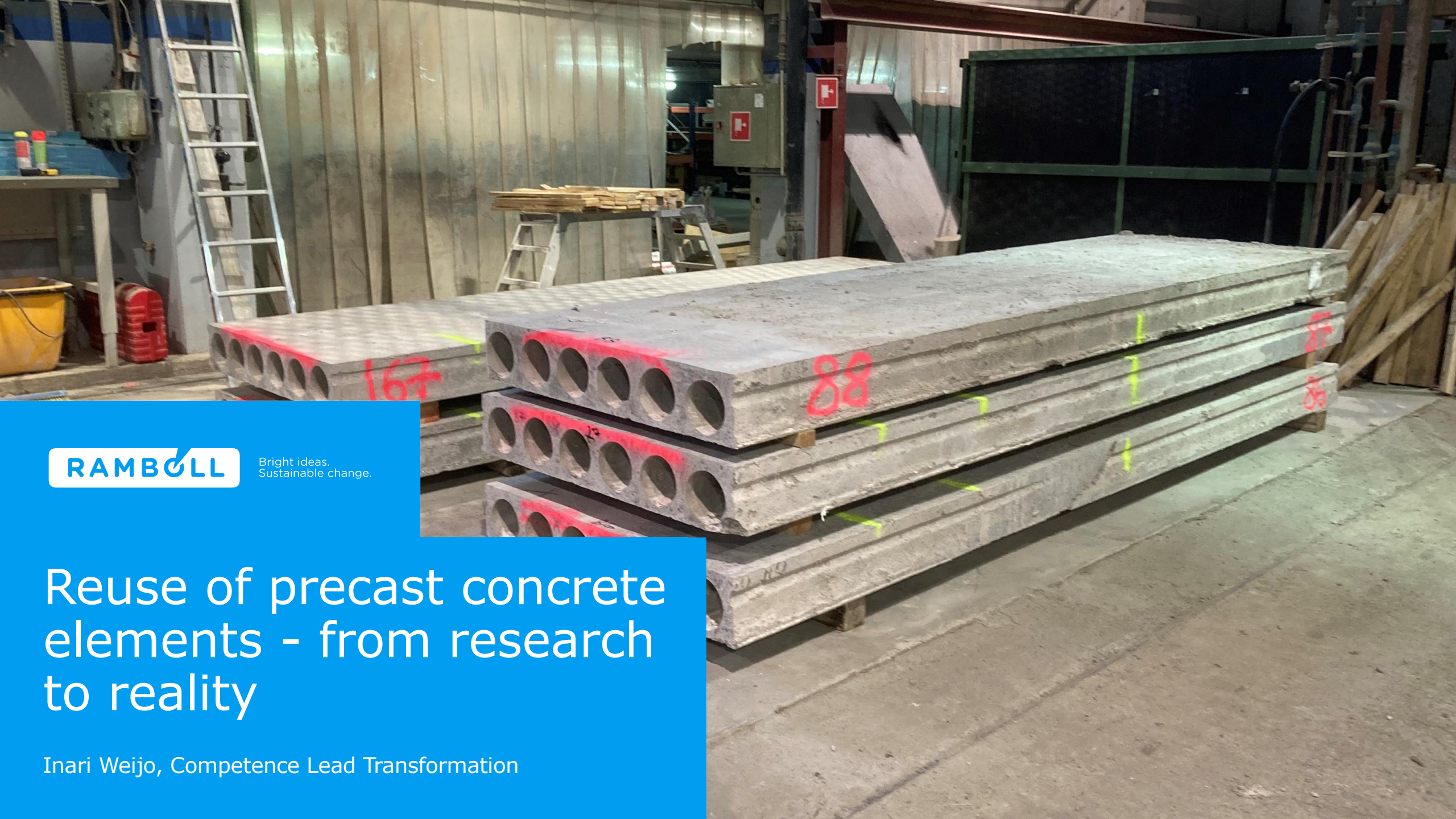


RAMBØLL

Bright ideas.
Sustainable change.

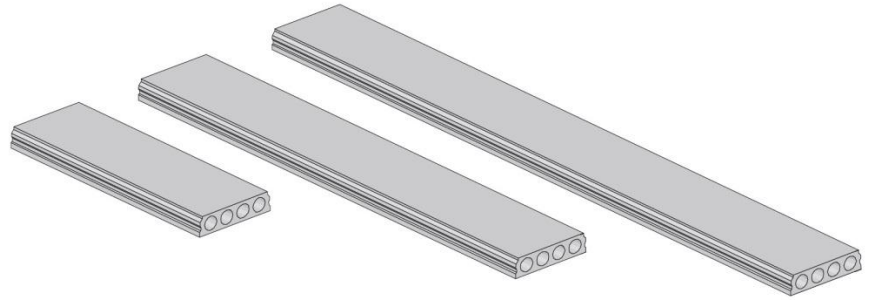
Reuse of precast concrete elements - from research to reality

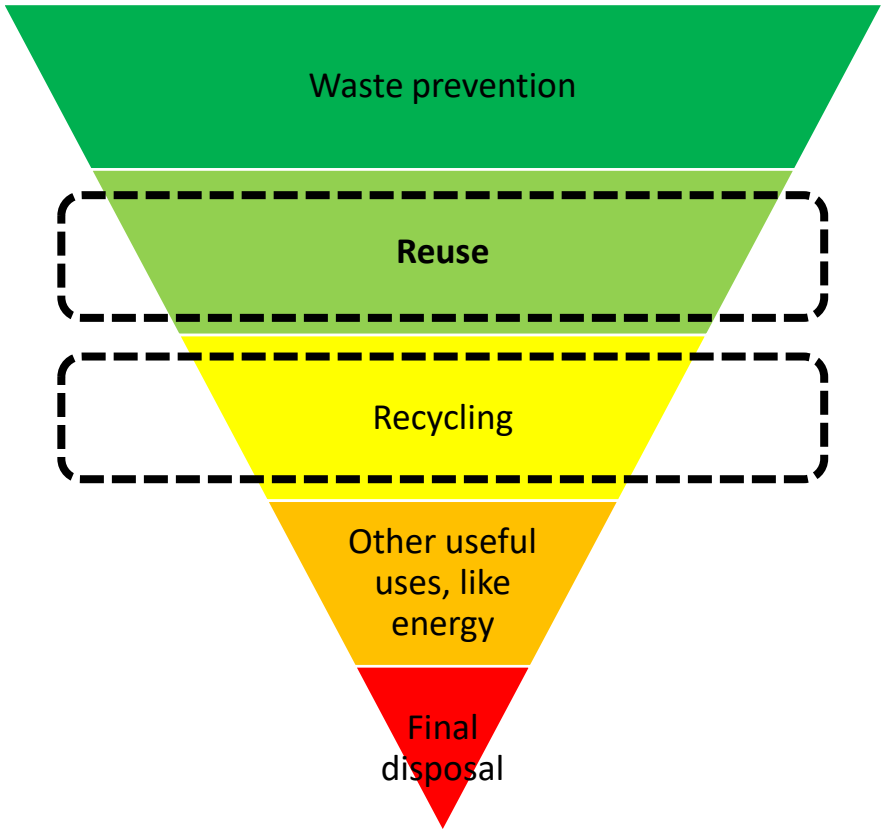
Inari Weijo, Competence Lead Transformation

ReCreate

Funded by the European Union

Motivation for research





Average age of building to be demolished in Finland is 43 years! *

Huuhka&Lahdensivu 2016

Desktop study of residential building

	new building			reuse	
	total	[%]		total	[%]
air raid shelter	45101	4.1		8196	3.3
bearing structures	626656	56.7		31333	12.7
roof	115231	10.4		23046	9.3
balconies	24993	2.3		1250	0.5
facades	104728	9.5		5236	2.1
slab on ground	26462	2.4		15386	6.2
non-bearing walls	4462	0.4		4462	1.8
foundations	16298	1.5		16298	6.6
piles	141820	12.8		141820	57.4
	1105751			247028	

BUILDING FRAME

77 % smaller carbon footprint

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958200.

ReCreate

Funded by the European Union

Reusing precast concrete for a circular economy

- EU Horizon 2020 financed project for 2021-2026
  - Approx. 12,5 M€
  - Total costs approx. 14,3 M€
- Countries involved
  - Finland (Coordinator TAU)
  - Sweden
  - The Netherlands
  - Germany
  - Croatia
- **Finnish consortium**
  - Tampere University TAU
  - City of Tampere
  - Ramboll Finland (design and consultancy)
  - Skanska (contractor)
  - Umacon (demolition contractor)
  - Consolis Parma (precast concrete manufacture)
  - Liike Oy Arkkitehtistudio (architects)

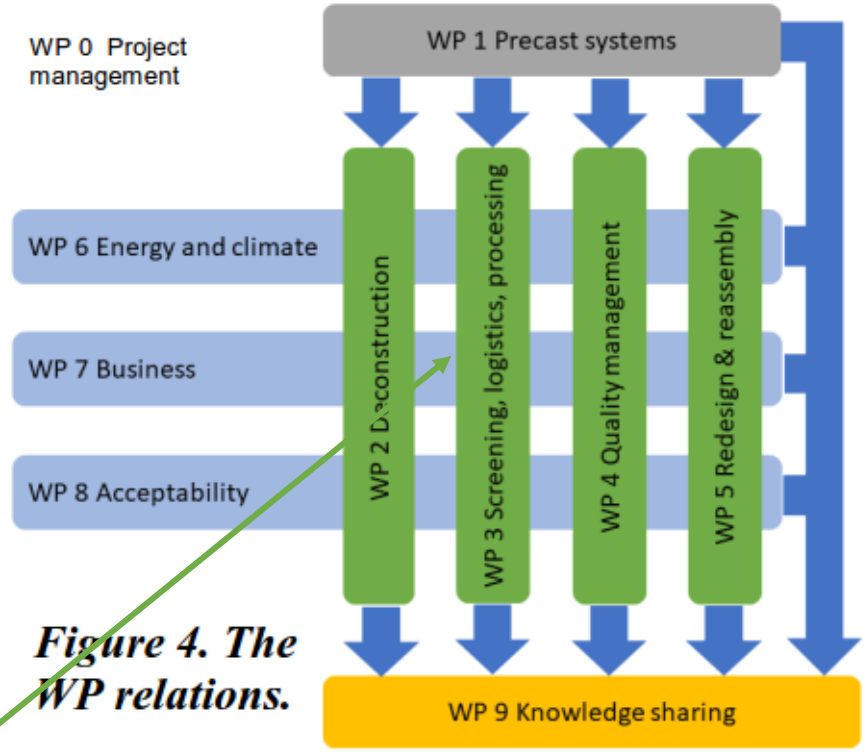


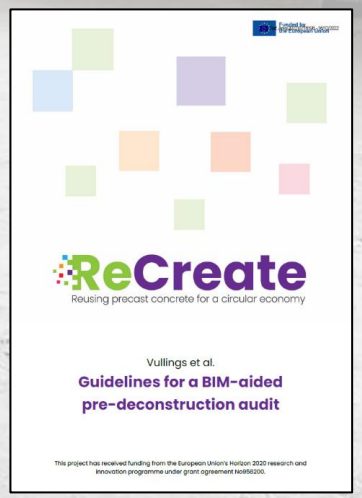
Figure 4. The WP relations.

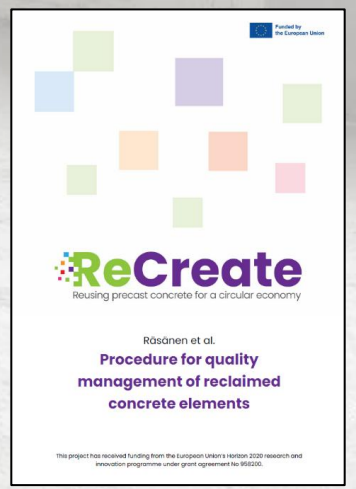
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958200.

PROCESS FOR QUALITY MANAGEMENT

Pre-deconstruction audit → **Structural surveys and harmful substances** → **Deconstruction design and execution** → **Redesign, additional testing and reassembly** → **Product approval and certification**

To create gradually refining, systematic process





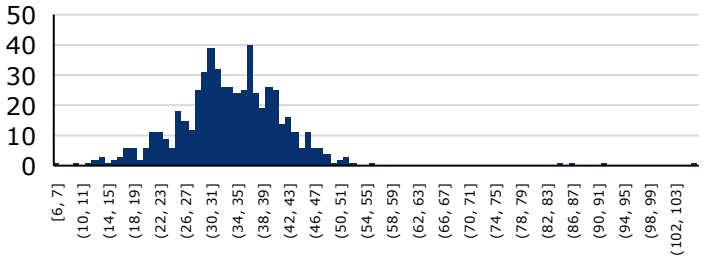
https://cordis.europa.eu/project/id/958200

Quality: Non-destructive testing, sampling and laboratory tests

- Rebound hammer tests
- Cover depth of reinforcement
- Ultrasound tomography for possible invisible defects
- …pressive strength from co…
- …ization depths
- …and harmful
- …bestos, V…
- …ruction …
- …l scale

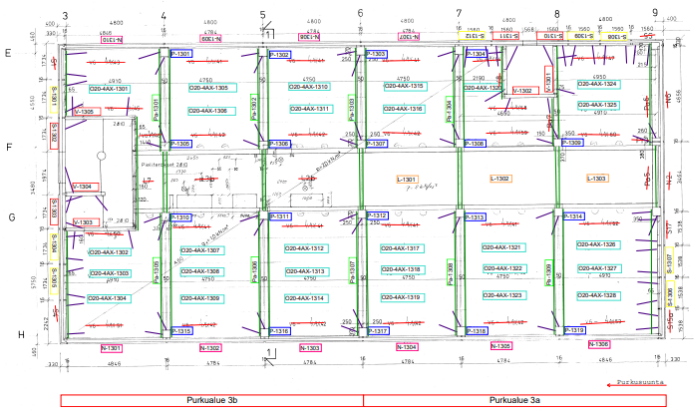
Proof of eligibility for building authorities

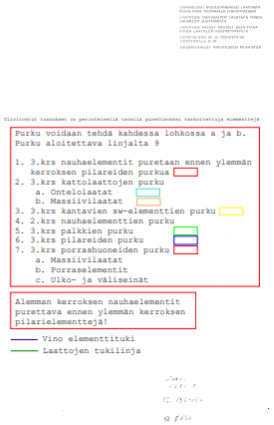
Column RF cover



Dismantling design

- Dismantling design: ”ordinary” demolition and dismantling of precast concrete parts to be reused.
  - The demolition order and selection of suitable building parts for reuse
  - Developing new lifting parts and temporary support





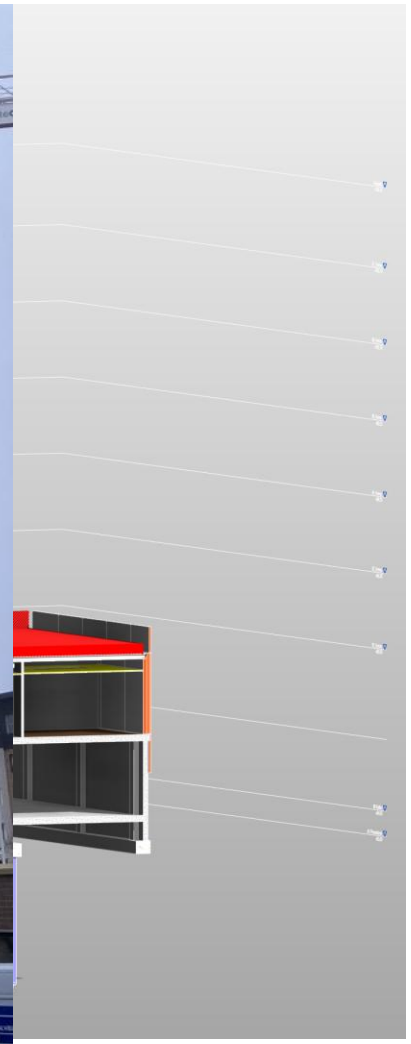
Kerros	Elementtityypit							
	N	S	P	Pa	V	L	OL	KS
1.krs	6	0	0	5	2	3	24	0
2.krs	10	0	19	9	3	3	27	0
3.krs	10	12	19	9	5	3	28	0
4.krs	10	12	19	9	5	3	28	0
5.krs	10	12	19	9	5	3	28	0
6.krs	10	12	19	9	5	3	28	0
7.krs	10	12	19	9	5	3	28	11
yht	**66**	**60**	**114**	**59**	**30**	**21**	**191**	**11**
Max. paino (arvio) [tn]	**3**	**3**	**1**	**3**	**4**	**5**	**1,5**	**1**

Kappalemääriin on laskettu rakennekuvien perusteella ehjäksi oletetut elementit, esimerkiksi väliseinien kappalemääriin ei ole otettu oviaukollisia elementtejä huomioon.

N = nauhaelementti
S = kantava sandwich-elementti
P = pilarielementti
Pa = palkkielementti
V = väliseinäelementti
L = käytävän teräsbetonilaatta (massiivilaatta)
OL = ontelolaattaelementti
KS = vesikaton kuorielementti

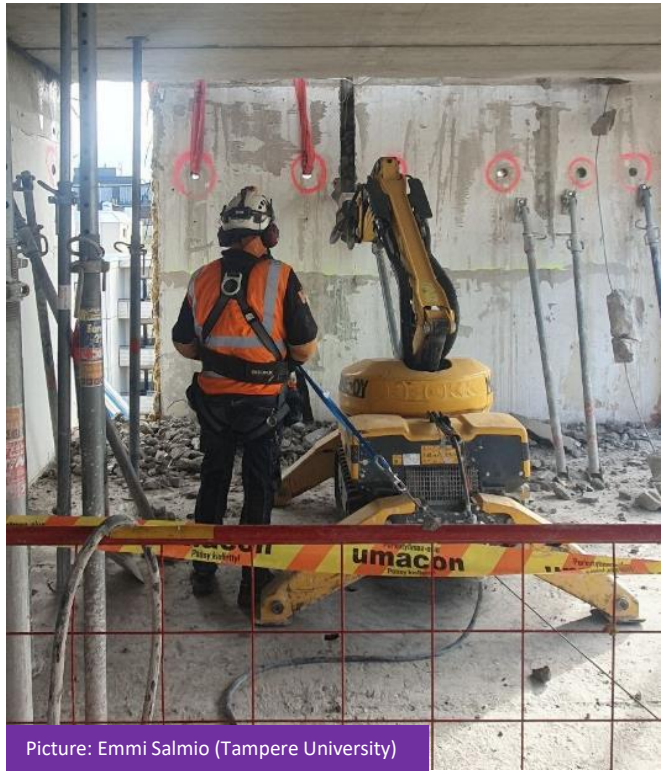
To ensure safety and intact process

Finland: Deconstruction pilot office building, built 1982



https://www.youtube.com/@recreateproject5023

Deconstruction work (Umacon)



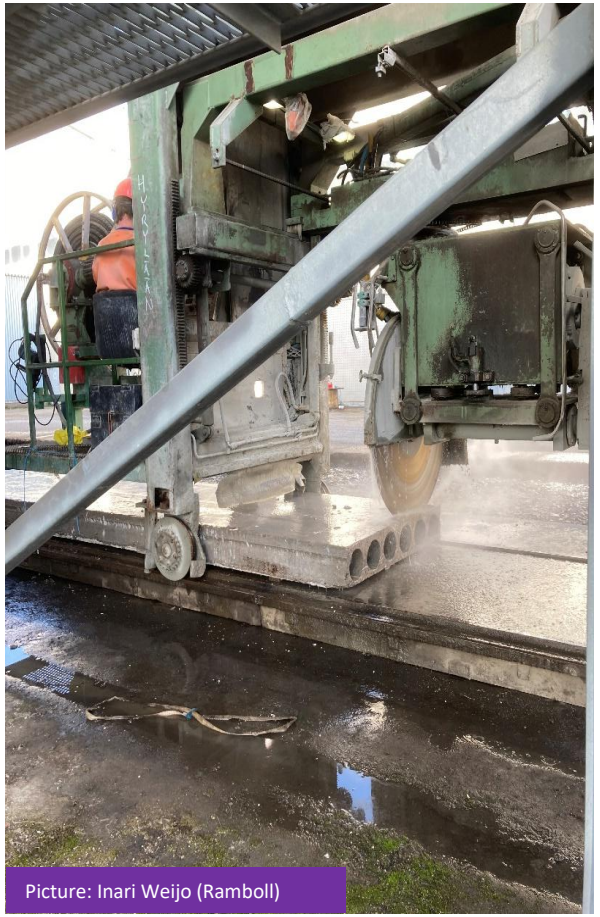
Picture: Emmi Salmio (Tampere University)


Picture: Emmi Salmio (Tampere University)

Columns, beams and hollow core slabs salvaged, ~260 pcs

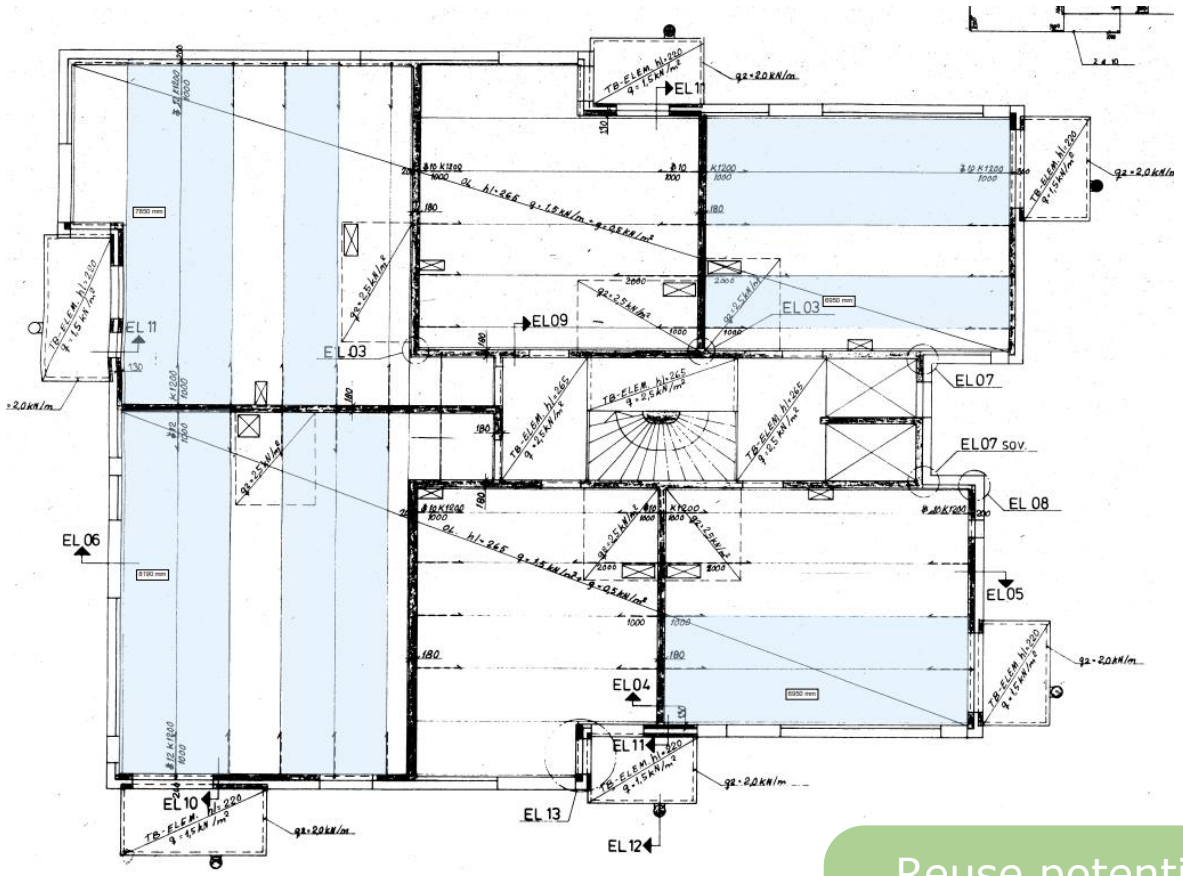
Refurbishment of elements (Parma Consolis)

Picture: Satu Huuhka (Tampere University)


Picture: Inari Weijo (Ramboll)

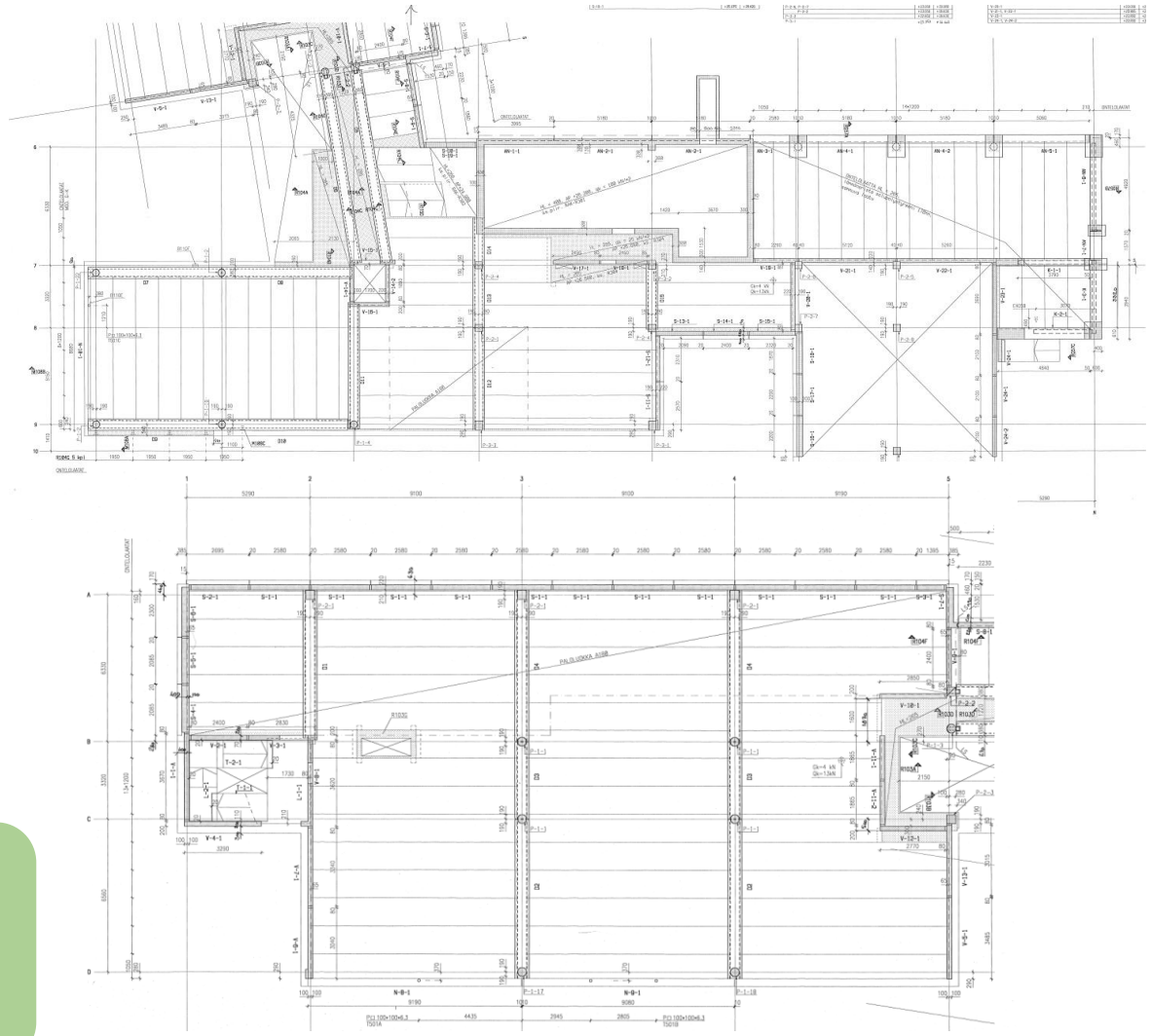

Picture: Teemu Stork (Parma)

Several commercial projects to examine reuse potential since 2022…



Residential building 1989

Reuse potential buildings found, nothing goes forward..



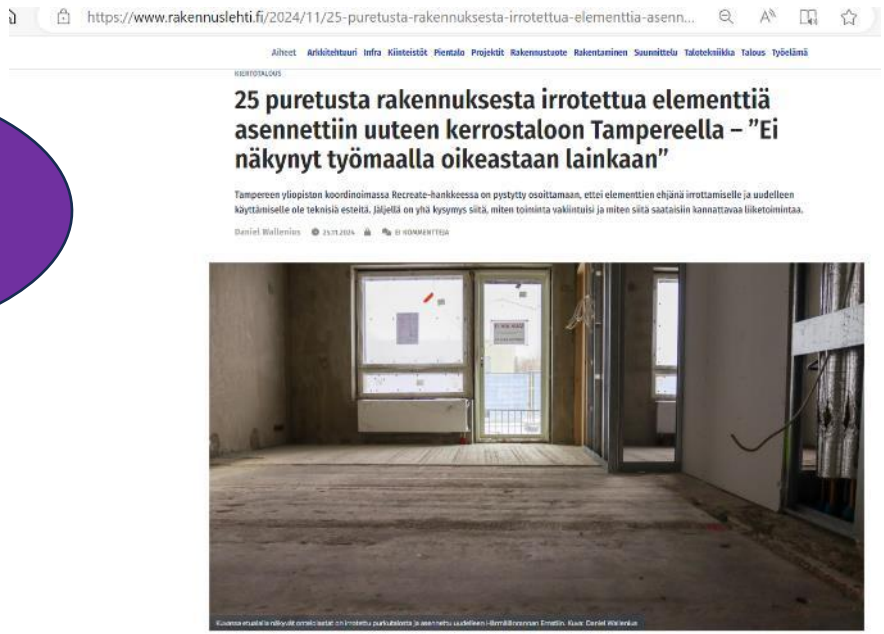
Office building 1995

First reuse pilot in media

- 25 hollow core slabs were installed in residential building in March 2024
- National Construction media article (in Finnish):
  - “Constructor tells it did not differ from ordinary construction”

Picture: Inari Weijo (Ramboll)

Picture: Skanska



https://www.rakennuslehti.fi/2024/11/25-puretusta-rakennuksesta-irrotettua-elementtia-asenn...

Aiheet Aridoitehtuuri Infra Kiinteistöt Pientalo Projektit Rakennustuote Rakentaminen Suunnittelu Talotekniikka Talous Työelämä

KIERTOTALOUS

25 puretusta rakennuksesta irrotettua elementtiä asennettiin uuteen kerrostaloon Tampereella – ”Ei näkynyt työmaalla oikeastaan lainkaan”

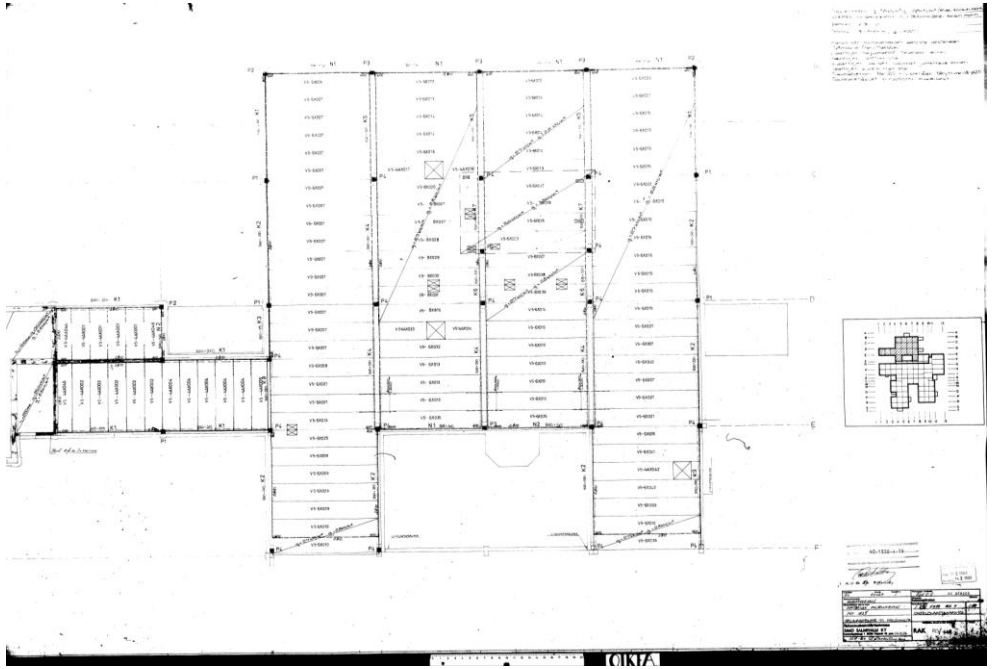
Tampereen yliopiston koordinoimassa Recreate-hankkeessa on pystytty osoittamaan, ettei elementtien ehjänä irrottamiselle ja uudelleen käyttämiselle ole teknisiä esteitä. Jäljellä on yhä kysymys siitä, miten toiminta vakiintuisi ja miten siitä saataisiin kannattavaa liiketoimintaa.

Daniel Wallenius 25.11.2024 0 KOMMENTTEJA

We want them too!

Funded by the European Union

First commercial deconstruction project 2025!



umacon

RAMBØLL

CONSOLIS PARMA

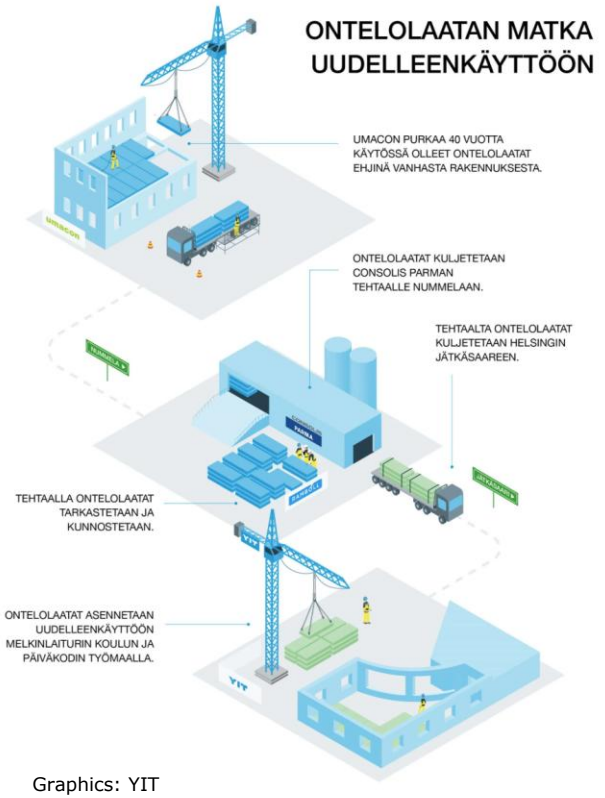
From school to another

- Suutarila municipality house (1981) from Helsinki dismantled 02-06/2025 (“donor building”)
- Hollow core slabs (64 pcs) were detached from roof structure (04/2025)

From school to another

- Hollow core slabs transported to Parma’s factory in Nummela, tested, refurbished and thermal insulation added according the plan (05/2025)
- Hollow core slabs supplied (06/2025) back to Helsinki, to install them in Melkinlaituri new daycare and school centre base floor, contractor YIT Rakennus Oyj

Source: YIT



Graphics: YIT

Reuse assessment and condition investigation

Focuses on reuse of building elements

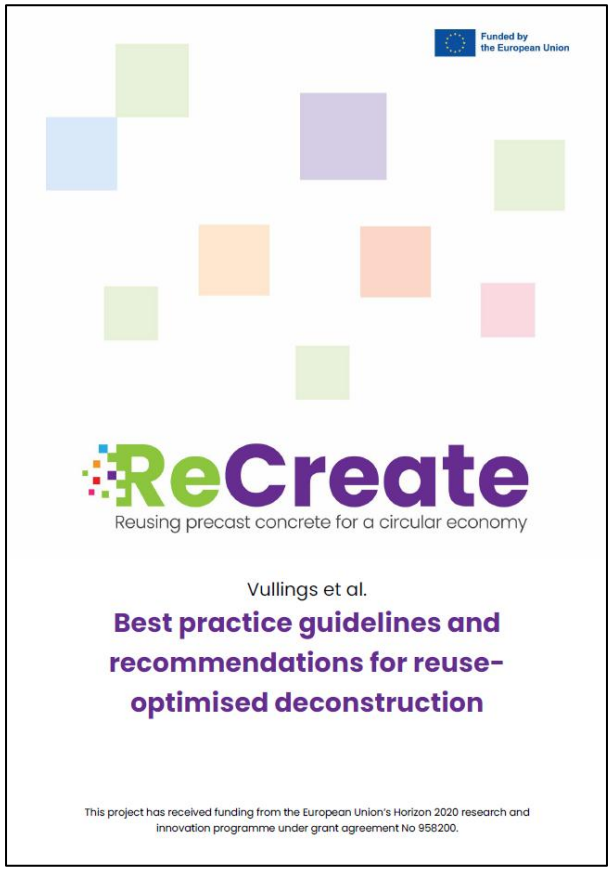
11/24 — 01/25 — 05/25 — 06/25 — 07/25 — 09/25 →

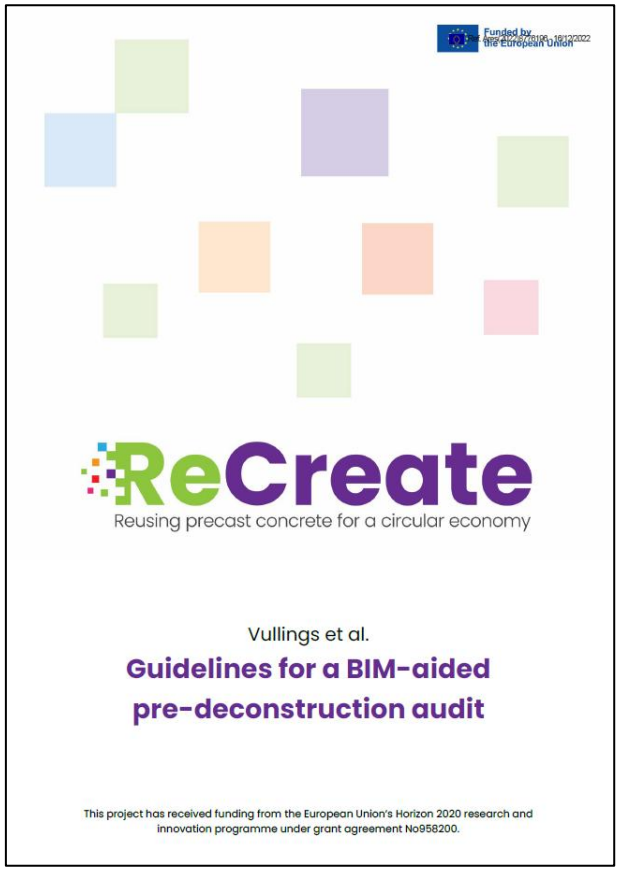
Demolition survey*	Reuse survey	Demolition and detachment planning	Planning and Permits	Repair of building components	Proof of Eligibility	Construction phase

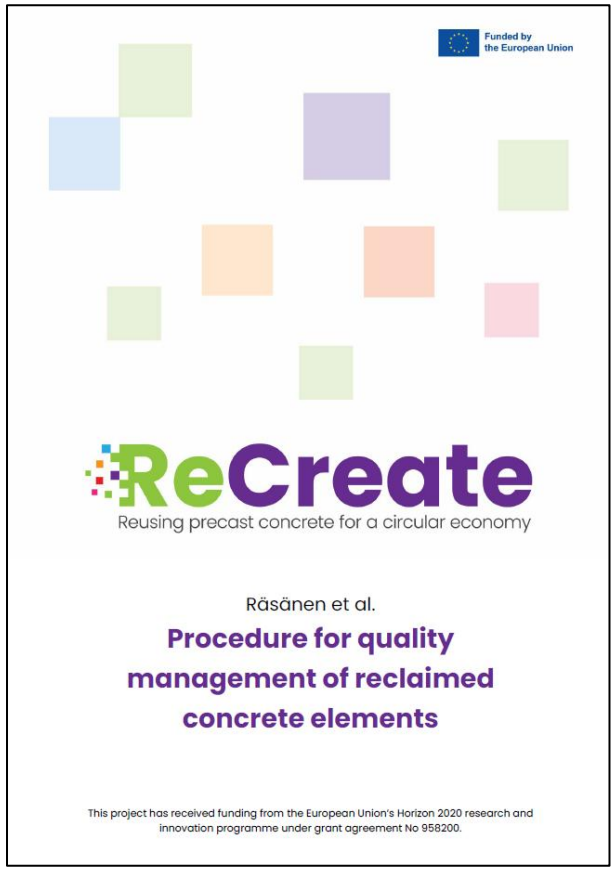
*Demolition survey, includes demolition material- and construction waste survey, Condition survey (incl. hazardous substance studies) and reuse survey

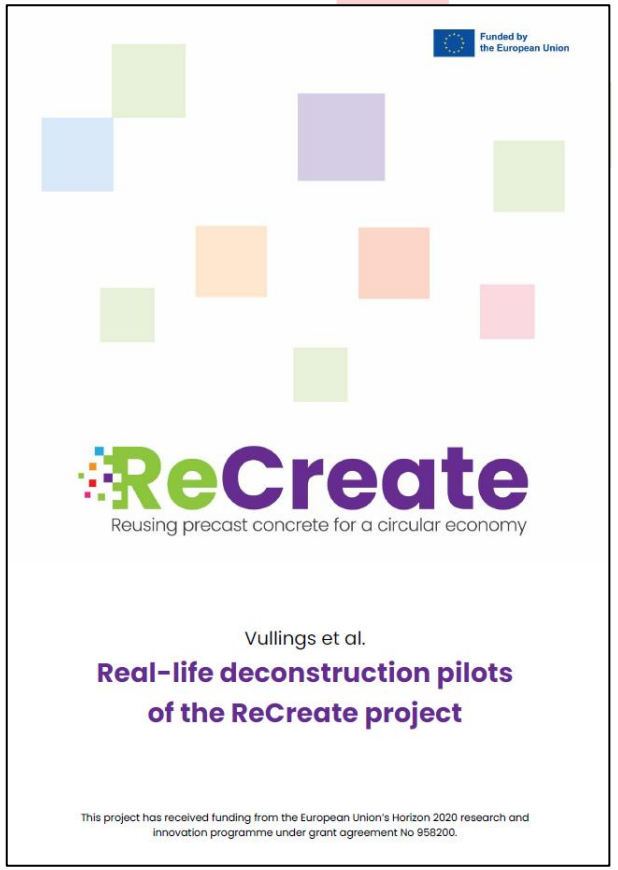
ReCreate

Publications so far, more to come!









Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958200.

Links

- Finnish website: https://tuni.fi/recreate
- International website: https://recreate-project.eu/
- YouTube: https://www.youtube.com/@recreateproject5023
- EU-project card: https://cordis.europa.eu/project/id/958200
  - All the publications available in the reporting-page

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958200.

ReCreate

Follow our project in social media

- X (Twitter): https://x.com/ReCreate_H2020
- LinkedIn: https://fi.linkedin.com/company/recreate-project
- Facebook: https://www.facebook.com/ReCreateH2020/
- Instagram: https://www.instagram.com/recreateeu/

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958200.