

Parking Lysbüchel - Basel

Ressource assessment of structural elements

Factsheet LYS03 – Column

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The parking Lysbüchel is a building located at Elsässerstrasse in Basel, erected in 1970. It consists of four floors including a parking, storage spaces and mezzanines with offices. Floors 1 to 3, which are the largest area of the building, were designed as parking. Immobilien Basel-Stadt is planning its deconstruction.

The building is composed of prefabricated prestressed concrete elements. The ribbed slabs are placed on transversal beams which are supported by columns. A thickness of 8 cm of cast-in-place concrete is placed on the top surface of the prefabricated slabs, creating a continuous slab system. The slabs and transversal beams were manufactured by Stahlton AG.

Existing reports used for the elaboration of the factsheet:

- A. CSD Ingénierie AG, Volta Nord - Rückbau Baufeld 4 – Konzept Kreislaufwirtschaft, Basel, 03.06.2022
- B. Zweidler, Simon & Häfeli, Beat. Versuchsbericht: vorgespannte Rippenplatten – ReUse Parkhaus Lysbüchel, Basel. Fachhochschule Nordwestschweiz, Muttenz, 05.05.2022.

Factsheet list for this building:

Factsheet LYS01 – Ribbed plate Stahlton

Factsheet LYS02 – Supporting Beam Stahlton

Factsheet LYS03 – Column

Disclaimer: This document is a preliminary resource assessment and should be used as such. The results presented are based on visual inspections and on limited material testing. Material properties and detailed condition of each elements should be further assessed prior to any reuse of the elements described herein. The authors deny all liabilities with respect to the use of the information given in this document.

Type LYS03

Category: Column elements

Columns

Location

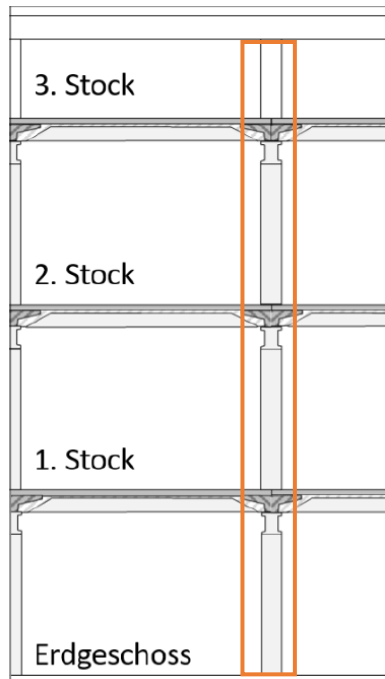


Figure from CSD Ingenieure, reference A



Photo from Zirkular AG

Ribbed plate Stahlton

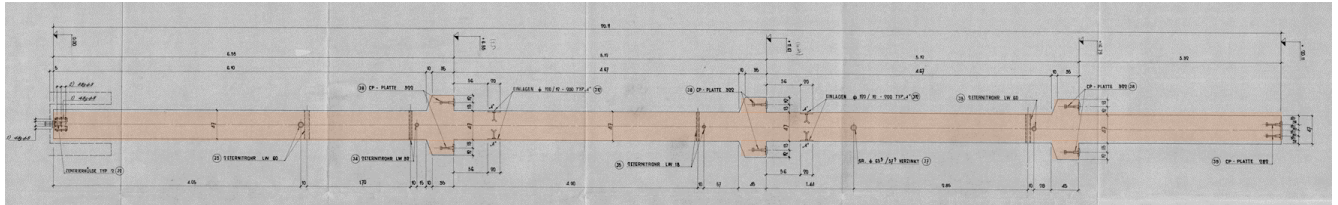


Photos from Zirkular AG

Type LYS03
Columns

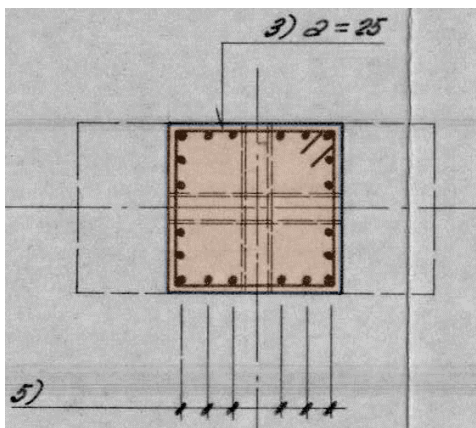
Category: Column elements

Subtype n°1, dimensions



Subtype n°1, cross-section dimensions

1:20



Type LYS03 Columns

Category: Column elements

Description				Condition and durability	
Construction year	1970			Condition assessment	n.a., to be investigated
Material	Precast reinforced concrete			Carbonatation depth [mm]	n.a., to be investigated
Actual location	All columns of the parking			Toxic substance	Eternit tubes, to be further investigated
Initial function	Structural column element				
Accessibility	Moderate – Ribbed slabs and supporting beams should first be removed				
Anchor points	None				
Exposition	Indoor, not directly exposed to rain				
Color	Grey				
Finishing	Exposed concrete				
Overlays	Type	Fixation	Thickness		
	-	-	-		
Connexion type	n.a., to be investigated				
Deconstruction tool	Diamond saw				

Mechanical characteristics

Concrete density (ρ_c)	n.a.
Concrete compressive strength (f_{ck})	n.a., to be investigated
Concrete young modulus (E_{cm})	n.a., to be investigated
Reinforcement tensile strength (f_{sk})	n.a., to be investigated
Reinforcement young modulus (E_s)	n.a., to be investigated

Element	Geometry			Inventory					Environmental impacts					
Subtype	Dimensions (W x L x h) [mm]	Reinforcement [mm]	Cross-section characteristic resistance [kNm]	Quantity [u]	Weight [kg/u]	Total area [m ²]	Total volume [m ³]	Significance	Initial production	Conventional demolition	Dismantling by sawing	Initial production	Conventional demolition	Dismantling by sawing
									[kgCO ₂ -eq/u]			[kWh oil-eq/u]		
1	470 x 470 x 20110	20 x d20 Stirrups d8 s=250	n.a.	54	11898	n.a.	253	n.a.	2273	143	0.032	5223	595	1.7
23	470 x 470 x 19180	20 x d20 Stirrups d8 s=250	n.a.	3	11301	n.a.	13.5	n.a.	2158	136	0.032	4961	565	1.7
48B	470 x 470 x 20110	20 x d20 Stirrups d8 s=250	n.a.	1	11840	n.a.	4.7	n.a.	2261	142	0.032	5198	592	1.7
56B	470 x 470 x 12550	20 x d20 Stirrups d8 s=250	n.a.	1	7403	n.a.	2.94	n.a.	1414	88.8	0.032	3250	370	1.7
61	470 x 470 x 13740	20 x d20 Stirrups d8 s=250	n.a.	6	8086	n.a.	19.07	n.a.	1544	97.0	0.032	3550	404	1.7

Type LYS03 Columns

Category: Column elements

Additional information

Additional note	> The elements were not inspected by the authors of this factsheet which was created using only the available drawings. A complete inspection and investigation should be carried out to validate the suitability of these elements for reuse, in particular regarding their condition. This should be carried out prior to the detail design phase of the project reusing the elements. > Since the details on the reinforcement contained in the section are not available, the environmental impact is calculated by neglecting the weight of the reinforcement and therefore only considering the weight of the precast concrete. The results may be underestimated. > The embodied global warming potential (in kgCO₂eq) and the grey energy (in kWh oil-eq) for fabrication and demolition of the elements is calculated using their weight and the equivalent factors available in the Life Cycle Assessment KBOB database. The considered factors are the following: Precast concrete element, normal concrete, from factory - KBOB ID-Number 01.043.
Attention point	> The depth of carbonation of the concrete is unknown, but it can be assumed to be similar what was measured for the ribbed plates (Factsheet LYS01), i.e. around 20 mm. There is thus a risk of corrosion of the stirrups and they elements should be inspected to check for any corrosion stains. > To prevent development of corrosion, the elements should be protected against water and humidity. > Eternit tubes, that might contain asbestos fibers, are casted in the columns. Measures should be talking to remove those tubes or prevent them from being damaged.