Experience from recycling building materials 2023

Rensdyrvej 8, Vipperød

The house was built in 1950 and used for housing the principal of the school.

As the school expanded in the late sixties and seventies with a new recreational sports hall, the surroundings around the house changed the buildings status. In a periode it was in use for the local group of scouts.

The scouts left the building, and house was set to sale, - impossible due to the surroundings.

Rensdyrvej in Vipperød

The house was originally used for housing the principal of the school. Builded in the early thirties.

As the school expanded in the sixties and seventies with a new recreational sports hall, the surroundings around the house changed the buildings status. In a period it was in use for the local group of scouts.

The scouts left the building and it was empty for a number of years. The house was set to sale, - impossible due to the surroundings.

Roof tiles

The tiles have been taken down one by one, cleaned from mortar on the back side, then stacked on pallets.

The surface has a fouling off alges that need to be cleaned.

Dismantling of the tiles and stacking on pallets has taken approximately 130 manhours, equivalent to one hour per m2 .

Total, - 15 pallets, tiles are stacked in two layers of 14 bundles, with 5 tiles in each bundle. Total 2,100 usable tiles

The roof area was estimated to 135 m2, approximately waste is 2,5 m2.

Dismantling

Dismantling of roof structure, rafters, battens and layer of beams

Dismantling woodwork from the roof approx. 50 hours

Roof construction

Removal of the ceiling and cleaning of boards and battens for nails and plaster approx. 30 hours

Beams 5x6"- 24 pcs of 3,5 m

Rafters 5x5" - 20 pcs of 5,5 m

Rafter, horizontal 4x4" - 15 pcs of 3 m

Floorboards 5/4 x 5"- 110 pcs of 4 m

Formboards wood 3/4 x 4" - 160 pcs of 3 m

Formboards, wood 3/4 x 4" - 50 pcs of 3.5 m

Battens - 80 pcs of 3,5 m

Dismantling masonry

Masonry is cleaned from plaster on the inner side

The wall has cavity wall insulation in the outer wall construction. It must be sorted out from the stones.

Plaster with paint has been sorted out separately, as it has different old harmful substances and chemicals in it.

The brick is taken down one by one and cleaned by hand.

Floor beam layer

Beam layer on the ground floor,

The floor covering, (carpet) has served as protection for the floorboards.

There are deposits of clay in the cavity, then 1 x 4” wood, straw and lime mortar on the underside down towards the basement.

Floor

The floorboards have been cleaned of nails.

The joint and groove are partially damaged when removing the boards.

The boards measure about 26 mm in thickness and 123 mm in width.

The utilization is approx. 22 x 100 mm if you cut the edges and plane the boards to size in thickness.

There is approx. 110 m2 in all.

Bricks

The stone is packed on pallets. There are approx. 36 stones per layer, corresponding to approx. 1/2 m2 of masonry

The stone will be kept in storage and will be included as the builder delivery in a new project.

The stone is ready for inspection by the bidders, before contract negotiations.

Bricks

Hand cleaned stone from Vipperød 8

The stone has been taken down one by one and hand cleaned from lime mortar.

7000 whole and approx. 3500 half stones have been cleaned, consumption approx. 360 hours

The house has been bricked in half-stone pattern compounds.

The stones in the façade are predominantly yellow. The backwall stones are red, yellow and flamed.

Hollow bricks from Holbæk Svømmehal

Hollow stones from Holbæk Svømmehal.

In the mortar for the bricklaying there was used mixture of lime and cement. It was not expected that it was possible to clean the bricks for reuse.

Normally this type of bricks will be destroyed when taken down as the cement mixture is stronger than the stones.

The masonry was knocked down with an excavator, - on site, part of it was cleaned by hand. Another part was loaded in a container, - moved to Vipperød, and cleaned there, due to the local site conditions.

10,300 bricks was saved in full size and about 600 half. The bricks was cleaned by hand and stacked on pallets. Approx. 165 m2

Time consumption is approx. 300 hours, equal to ½ hour per square meter piecework price is around DKR 7.50 per stone.

The hollow stones has patina and damages, they can not be used as façade bricks.

Building site

Additional whole and half stones are expected from cleanup around the building, as well as the remaining part of the basement.

The bricks have a front and back side. We tried to remove the paint with a pressure washer without success.

It will be possible to remove the paint by sandblasting, which will leave patina, - reduce living time as the incandescent shell of the stone will be removed.

Rapport

Image and excerpt of the material study

When finished we had a total of 8000 whole stone and 4000 half stones, same as 158 m2 .

The report states 158 m2, but the actual no is approx. 230 – 240 m2 in total.

All stones less tan half is not utilized, - some has been grooved out for electrical wiring and water installations and other damages.

Consumption is 63 stones per m2

The utilization rate is 66 %

The remaining part is recycled.

Materialets stand

Murstenene er gule og har standardmålene (23cm x 5cm x 25cm). De er sat i kalkmørtel og er generelt uden skader, med undtagelse af kælder, hvor der er fugtpåvirkede sten. Der er ca. 93 m^2 mursten på facaden med i alt ca. 5.900 stk.
Derudover er der anvendt mursten til indvendige vægge, hvor der er ca. 65 m^2 til i alt 4.100 stk. Sammenlagt er der altså omkring 158 m^2/10.000 stk. Facademurstenene er pudset med gulfarvet puds, og de indvendige mure har malet puds og tapet.

Prøve ID	Type	Beskrivelse, placering	Bly [mg/kg]	Cadmium [mg/kg]	Chrom [mg/kg]	Kobber [mg/kg]	Kviksølv [mg/kg]	Nikkel [mg/kg]	Zink [mg/kg]	PCB total [mg/kg]	Spor af (KP) klorparaffiner	Kortkædede KP [mg/kg]	Mellemkædede KP [mg/kg]	Asbest
R1	Linoleum	Ældre, gulv, stue	4,3	60	1,8	2	#	1,5	380	#	ip			ip
R2	Maling	Trævindue, ind/ud, stue	5,8	0,46	5,8	17	0,03	3,5	99	#	ip			
R3	Maling	Facadepuds	19	3,3	24	9,7	0,06	8,6	1700	#	ip			
R4	Maling	Puds, bag træplade, stue	230	0,72	3,1	4,6	0,23	4,4	1700	0,066	ip			
R5	Maling	Hvid puds, loft, stue	20	0,44	9,6	3,6	0,14	5	230	0,38	ip			
R6	Maling	Grå træ, lister, døre, stue	2900	17	25	5,9	4,2	9,1	60000	0,31	ip			
R7	Lim	Bag træplader, væg, stue								0,6	ip	#	#	
R8	Maling	Hvid, væv, væg, 1. sal	9,4	#	35	#	#	6,2	19	0,1	ip			
R9	Maling	Hvid, puds, væg, 1. sal	7,2	0,25	5,1	3,7	#	4,8	19	#	ip			
R10	Maling	Grøn, væg, kælder	12	0,42	73	540	0,11	28	100	0,39	ip			
R11	Maling	Sokkelmaling	23	0,2	26	21	#	15	270	#	Ja	#	#	
R12	Flise, klæb	Hvid, væg, WC, stue	12	0,14	4,3	4,4	0,01	9,6	53					ip
R13	Flise, klæb	Grå, gulv, WC, stue	2,1	#	3,5	4,1	#	16	7,4					ip
Vejledende grænseværdier for uforurenet materiale /1/			<40	<0,5	<500	<500	<1	<30	<500	<0,1	ip	<2.500	<2.500	ip
Vejledende grænseværdier for forurenet materiale /1/			<2.500	<1.000	<1.000	<2.500	<2.500	<1.000	<2.500	<50				
Vejledende værdier for farligt materiale /1/			>2.500	>1.000	>1.000	>2.500	>2.500	>1.000	>2.500	>50	Ja	>2.500	>2.500	Ja

#: under detektionsgrænsen.

ip: ikke påvist.

: ikke analyseret.

Danish traditional material consumption masonry in 1925

All internal walls and ceilings has a layer of plaster, consisting of lime, sand and gravel. Most of the material will be deposited as most is contaminated from paint, remains from insulation and straw.

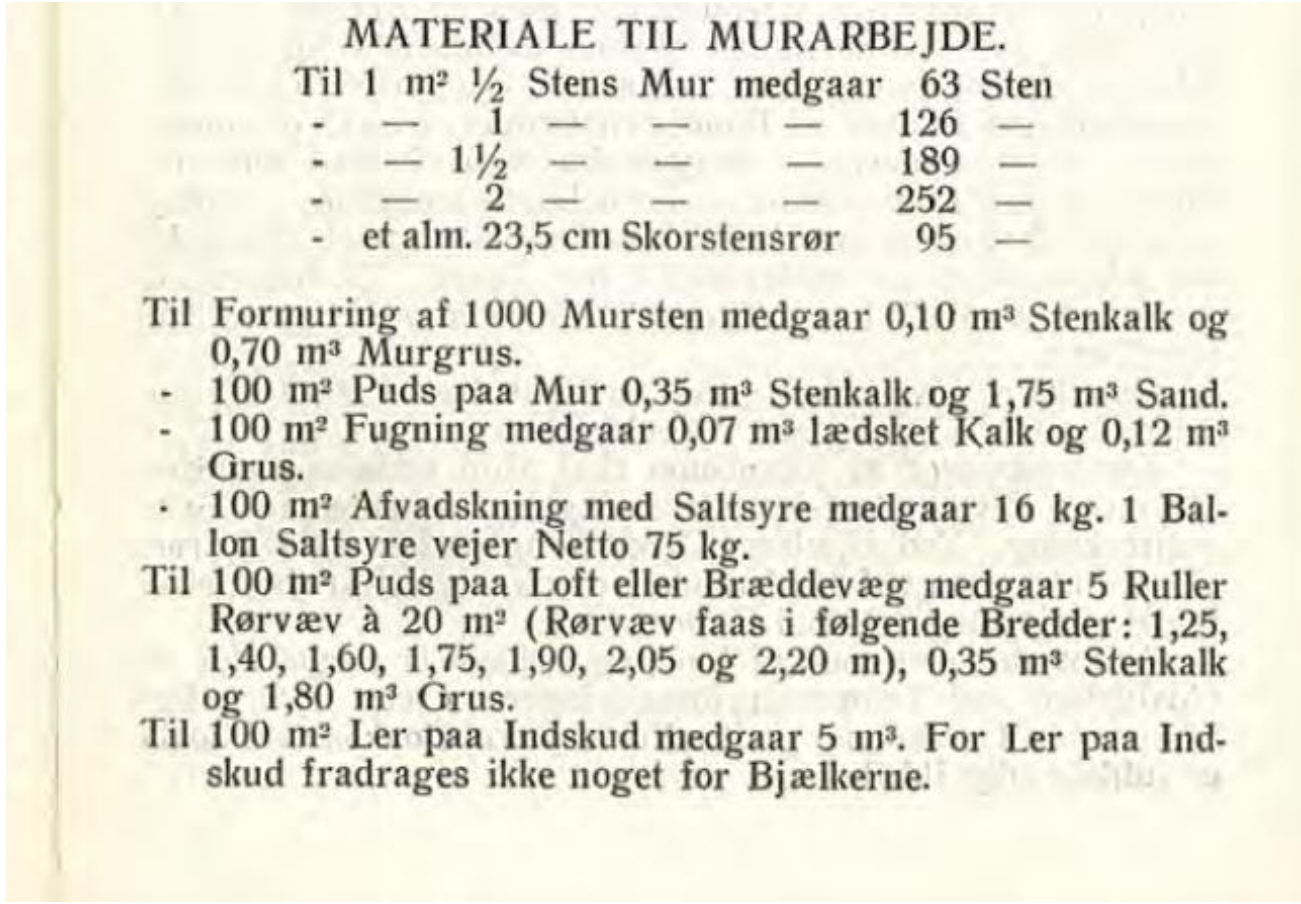
Straws, wallpaper will be sorted out as burnable.

Masonry mortar approx. 12 m3

Plaster on masonry approx. 6 m3

Plaster on straw approx. 5,8 m3

Clay, (fire protection), approx. 6,8 m3



MATERIALE TIL MURARBEJDE.

Til 1 m² ½ Stens Mur medgaar 63 Sten
- — 1 — — — 126 —
- — 1½ — — — 189 —
- — 2 — — — 252 —
- et alm. 23,5 cm Skorstensrør 95 —

Til Formuring af 1000 Mursten medgaar 0,10 m³ Stenkalk og 0,70 m³ Murgrus.
- 100 m² Puds paa Mur 0,35 m³ Stenkalk og 1,75 m³ Sand.
- 100 m² Fugning medgaar 0,07 m³ lædsket Kalk og 0,12 m³ Grus.
- 100 m² Afvadskning med Saltsyre medgaar 16 kg. 1 Ballon Saltsyre vejer Netto 75 kg.

Til 100 m² Puds paa Loft eller Brædde væg medgaar 5 Ruller Rørvæv à 20 m² (Rørvæv faas i følgende Bredder: 1,25, 1,40, 1,60, 1,75, 1,90, 2,05 og 2,20 m), 0,35 m³ Stenkalk og 1,80 m³ Grus.

Til 100 m² Ler paa Indskud medgaar 5 m³. For Ler paa Indskud fradrages ikke noget for Bjælkerne.

Recycling

Use of rafter wood for wooden floor.

Rafter wood is cut up into slices of 16-20 mm thickness and glued to the floor plate with cam joints. Bricks are sanded and surface treated.

Recycling

The use of floorboards and formwork for sound panel walls. Wood is cut up into moldings of varying widths, 19-32 mm, and thicknesses, 16-19 mm. Panels are made in 60 cm modules at a height of 240 cm.

Recycling

Panels are attached to a 16 mm frame, which is provided with a woolen fabric.

The sound panels are mounted on a base of fire-treated Kerto 45x45 mm per 600 mm. Distance between joists is filled with mineral wool