Burning Again

Co-built latrines using ash and garbage

Garbage in Flyranch

Collecting ash after burning

Component analysis of biomass ash (%)

Biomass group	SiO_2	CaO	K_2O	P_2O_5	Al_2O_3	MgO	Fe_2O_3	SO_3	Na_2O	TiO_2
Bitch bark	4.38	69.06	8.99	4.13	0.55	5.92	2.24	2.75	1.85	0.13
Forest residue	20.65	47.55	10.23	5.05	2.99	7.2	1.42	2.91	1.6	0.4
Pine bark	9.2	56.83	7.78	5.02	7.2	6.19	2.79	2.83	1.97	0.19
Pine chips	68.18	7.89	4.51	1.56	7.04	2.43	5.45	1.19	1.2	0.55
Poplar	3.87	57.33	18.73	0.85	0.68	13.11	1.16	3.77	0.22	0.28
Poplar bark	1.86	77.31	8.93	2.48	0.62	2.36	0.74	0.74	4.84	0.12
Sawdust	26.17	44.11	10.83	2.27	4.53	5.34	1.82	2.05	2.48	0.4
Spruce bark	6.13	72.39	7.22	2.69	0.68	4.97	1.9	1.88	2.02	0.12
Spruce wood	49.3	17.2	9.6	1.9	9.4	1.1	8.3	2.6	0.5	0.1
Wood residue	53.15	11.66	4.85	1.37	12.64	3.06	6.24	1.99	4.47	0.57

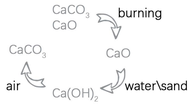
When wood is burned, wood ash is mainly composed of calcium oxides accounting for as much as 30% to 45%. When ash is mixed with water, the soluble component of wood ash (about 10%) is dissolved in water.

In this design, we mainly reuse the ash from burningman and garbage in flyranch to create ash double walls.

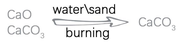
For ash, there are two methods to reuse it, one is high calcium way for ash bricks which benefit the overall strength performance of double wall, the other is mixing ash,sand and water derictly without increasing calcium content considering the conveniece of conostruction.
For garbage, there are more than 400 objects left on the flyranch from the interactive map. Most of them are broken wood, plastic objects, rusty cans, glas bottles and tires. We reuse the glass bottles for opening small windows on the ash walls and put other garbage into the wall for a special texture.

Pinciples of ash cement

For bricks



For walls



Amount calculation

Ash 4.674Kg/four-bays
Sand 7.011Kg/four-bays
Water 6.427m^3/four-bays

Construction process of ash cement walls

Step1 Preparing

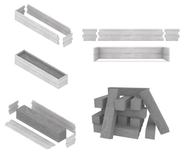
Step2 Adding ash into water

Step3 Pouring out impurities

Step4 Burning the ash cement

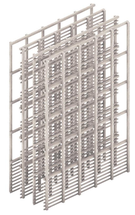
Step5 Mixing ash balls and sand

Step6 Stirring and making brick's material (high calcium)

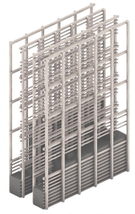


Step7 Making sand ash bricks

Step8 Mixing ash,sand,water and making wall's body material

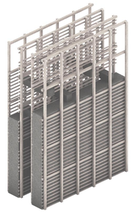


Step9 Set up the initial wood template for double walls



Step10 Pouring the ash cement and puting ash bricks inside

Step11 Adding garbage into walls

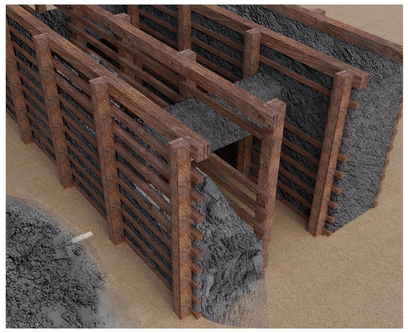


Step12 Completing wood template and building walls

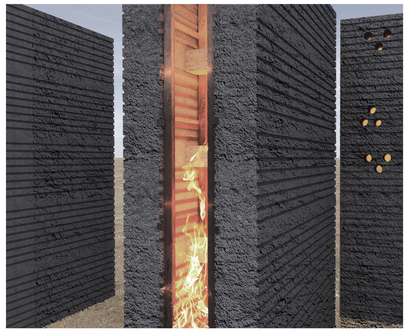
Step13 Inserting glass bottles into walls as small windows

Step14 Burning templates inside and using new ash for compost

Step15 Removing the templates outside and finishing double walls

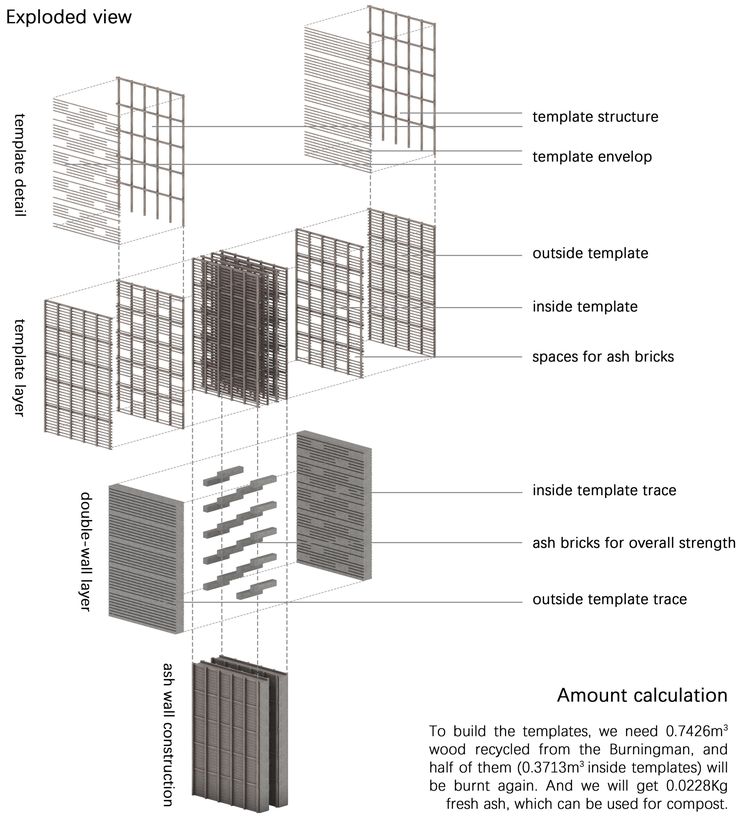


Pouring ash cement and adding ash bricks



Burning the inside templates

Exploded view



Amount calculation

To build the templates, we need 0.7426m^3 wood recycled from the Burningman, and half of them (0.3713m^3 inside templates) will be burnt again. And we will get 0.0228Kg fresh ash, which can be used for compost.