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Partial Embodied Carbon Calculation for Structure - Materials Options Study

Scope of Calculation: Cradle to.. Cradle (A1-D)

Gross Internal Floor Area (Optional): 1000 m²

NOTES: ECF = Embodied Carbon Factor Carbon = Carbon dioxide equivalent emissions for that module in kgCO ₂ e Seq = Sequestered Carbon in kgCO ₂ e			Module																		
			A: Product					B: Use		C: End of Life				D: Beyond							
			A1-A3 Product Manufacture		A4 Transport	A5w Site Wastage		A5a Site Energy Use	B1 Use	C1 Demo	C2 Transport of Waste		C3 & C4 Waste Processing and Disposal		D Outside the System Boundary						
Material	Units	Quantity	ECF A1-A3	Carbon A1-A3	Seq ECF A1-A3	Seq A1-A3	ECF A4	Carbon A4	ECF A5w	Carbon A5w	Carbon A5a	ECF B1	Carbon B1	Carbon C1	ECF C2	Carbon C2	ECF C3-C4	Carbon C3-C4	ECF D	Carbon D	
Typical	Concrete (C32/40, CEM I)	kg	367,500	0.1151	42,289			0.0053	1,957	0.0070	2,572	Not included - see note below.	-0.0029	-1,057	Not included - see note below.	0.0053	1,957	0.0072	2,663		
	Steel (Reinforcement)	kg	7,390	1.9900	14,706			0.0320	236	0.1074	794				0.0053	39	0.0130	96	-0.7900	-5,838	
				56,995				2,193		3,365			-1,057			1,996		2,759		-5,838	
Option 1	Concrete (C28/35, CIII/A)	kg	367,500	0.09014	33,128			0.00533	1,957	0.00575	2,114	Not included - see note below.	-0.0023	-828	Not included - see note below.	0.00533	1,957	0.008493	3,121		
					33,128				1,957		2,114			-828		1,957		3,121			
Option 2	Concrete (C28/35, CIII/A)	kg	245,000	0.09014	22,085			0.00533	1,305	0.00575	1,409	Not included - see note below.	-0.0023	-552	Not included - see note below.	0.00533	1,305	0.008493	2,081		
	Steel (Reinforcement)	kg	2,440	1.99	4,856			0.03195	78	0.10738	262				0.00533	13	0.013	32	-0.79	-1,928	
					26,941				1,383		1,671			-552		1,318		2,112		-1,928	

NOTE: This calculation is to compare options and only includes the ECF's which are based on materials quantities. Module A5s and C1 are based on project cost and floor area and not included here. Included modules are calculated in accordance with the IStructE publication 'How to calculate embodied carbon'.

Option	Total (kgCO ₂ e)	Within a range		Sequestration	Total/GIA (kgCO ₂ e/m ²)	Within a range		Sequestration
Typical	60,414	38508	90029		60.4	38.5	90.0	
1	41,448	23187	58240		41.4	23.2	58.2	
2	30,945	18277	42442		30.9	18.3	42.4	