

Results from Element Matching

Project name: Sognsveien 17

Construction site located at: 59.94161606, 10.72994518

Summary of results

Total score	Score without reuse	Savings	Substitutions
2068.58 kg CO2 equivalents	2114.16 kg CO2 equivalents	2.16%	10.53%

The 'Maximum Bipartite Matching' algorithm yields the best results, substituting 4/38 demand elements (10.53%). Using 'GWP' as the optimization metric, a total score of 2068.58 kg CO2 equivalents is achieved. For comparison, a score of 2114.16 kg CO2 equivalents would have been obtained by employing exclusively new materials. This results in a total saving of 2.16%. Note that impacts of transporting the materials to the construction site is not accounted for. Open the CSV-file "Sognsveien 17_substitutions.csv" to examine the substitutions.

Constants used in calculations

Constant	Value	Unit
Density timber	491.0	kg/m ³
Density steel	7850	kg/m ³
GWP new timber	28.9	kg CO2 equivalents
GWP reused timber	2.25	kg CO2 equivalents
GWP new steel	800	kg CO2 equivalents
GWP reused steel	4	kg CO2 equivalents

Information about datasets

Elements	Filename	Number of elements
Reused	pdf_supply.csv	100
Demand	DEMAND_TEST_FILL_CLOSEST.xlsx	38

Performance of algorithms

Name	Total score	Substitutions	Time
Maximum Bipartite Matching	2068.58 kg CO2 equivalents	10.53%	0.005s
Greedy Algorithm Plural	2068.58 kg CO2 equivalents	10.53%	0.026s

The design tool is runned with 2 algorithms, namely: Maximum Bipartite Matching, and Greedy Algorithm Plural. The Maximum Bipartite Matching yields the lowest score, as shown in the table. The substitutions by this algorithm are completed in 0.005 seconds.