

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 |
|---------------------------|---------------------------|---------|---------------|
| 285.29 kg CO2 equivalents | 813.29 kg CO2 equivalents | 64.92% | 76.0% |

The 'Maximum Bipartite Matching' algorithm yields the best results, substituting 76/100 demand elements (76.0%). Using 'GWP' as the optimization metric, a total score of 285.29 kg CO2 equivalents is achieved. For comparison, a score of 813.29 kg CO2 equivalents would have been obtained by employing exclusively new materials. This results in a total saving of 64.92%. 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 | pdf_demand.csv | 100 |

Performance of algorithms

| Name | Total score | Substitutions | Time |
|----------------------------|---------------------------|---------------|--------|
| Maximum Bipartite Matching | 285.29 kg CO2 equivalents | 76.0% | 0.026s |
| Greedy Algorithm Plural | 289.67 kg CO2 equivalents | 76.0% | 0.195s |

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 0.026 seconds.