4.440 / 4.462 Basic Structural Design
Spring 2009

CO_2 CONTENT FOR BUILDING MATERIALS

Based on the research conducted by MIT students, we conclude that one unit of building material (by mass) installed in a Boston building is responsible for the following portion of its mass in CO_2 emissions:

Material	CO_2 emissions as % of mass
Autoclaved Aerated Concrete	0.79
Concrete	0.20
w/ 30% fly ash replacement	0.18
Rebar	0.76
Hot-rolled steel sections[1]	0.80
Cold-formed steel[2]	1.70
Glu-lam timber	0.80
Dimensional lumber	0.05
Plywood	0.50
Brick	0.23
Concrete masonry units (CMU)	0.19
Glass[3]	0.18
Rammed earth[4]	0.01

In other words, one ton (2000 lbs) of plywood gives off 1000 lbs of CO_2 and 1000 kg of hot-rolled steel gives off 800 kg of CO_2.

[1] This includes all standard sections such as I-beams, pipes, angles, tubes, etc.
[2] This is for light-gauge steel such as lightweight galvanized steel framing and lightweight corrugated steel decking for concrete slab construction.
[3] This is for float glass, such as ordinary 1/8" or ¼" glass, and does not include insulated units or structural glass.
[4] This number would be significantly higher if the soil were stabilized with cement. For significant amounts of cement, the CO_2 content would lie between the value for concrete and rammed earth, and would be closer to 0.10.