Consideration of Human Health Impacts due to Indoor Exposure in the Sustainability Assessment of Buildings

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The aim of the project is to assess human health impacts originating from indoor exposure to chemicals released from building materials.

The topic of this master thesis is related to the Life Cycle Assessment of the Solar Decathlon House 2012, in order to support the sustainable report of this contest in a systematic and organized way. The assessment will be based on the previously conducted research on the material and chemical inventory of the Solar Decathlon House to obtain precise insights in the chemical emissions and exposures, based on the respective quantification and characterisation factors.

The project will start with quantification of the chemical emissions from building materials to the indoor environment. Building materials include the materials for construction of walls, floors, electric wiring, etc. The method used for quantification of emissions will be determined later. Options include literature review or modeling. This first step will result in calculation of indoor concentrations of chemicals.

The second step is the calculation of human exposure to the chemicals released from the building. Only a fraction of the chemicals present in the indoor air will end up in the human body. Human beings can be exposed via several pathways: respiratory, oral, or dermal. In this case, respiratory effects can be expected to result in the highest exposure. For that reason, the project will focus on respiratory effects.

Combination of the chemical's fate and exposure might be used in the development of characterisation factors for indoor toxicity for several chemicals.