Inter-generational distribution of the life cycle cost of an engineering facility

Abstract:
In decision making for civil engineering facilities, as well as other societal activities, the criteria for sustainability are inter-generational equity and optimality. Two challenging questions must be addressed in this context: How to compare the benefits and costs among different generations and how to compensate and adjust for the in-homogeneously distributed benefits and costs between the generations. To address and answer these questions for engineering facilities, first of all the temporal distribution of the life-cycle benefits must be assessed. To ensure optimality, the total life-cycle benefits for the facility must be maximized. In the present paper initially the normative criteria for sustainability are presented. Thereafter it is demonstrated how the criteria may be implemented for the purpose of optimization of structural design. The inter-generational distribution of benefits and the implications for sustainable decision-making are then illustrated by an example considering the optimal design of the concrete cover thickness of a RC structure subject to chloride-induced corrosion of the reinforcement.

Stichworte:
Sustainability, discounting, life-cycle cost, chloride-induced
corrosion, cover thickness

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