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The impact of self-healing on the life-time of materials JOHN GADDY, WOUTER MONTFROOIJ, University of Missouri, ALEXANDER SCHMETS, Delft University of Technology — Structural materials that are attributed with the (new) property of "self-healing" will obviously lead to safer, longer lasting and more reliable structures. The property of "self-healing" can be defined as the ability of a material to mitigate autonomously early stages of damage such as micro cracks, and many examples of materials with this properties have been reported in recent years [1]. In this contribution we investigate the effect of healing on the expected service life time of a model material. We apply a statistical mechanics' inspired computational approach to model the process of damage accumulation and on-site healing of a material under well defined loading conditions. We define a material as being at the end of its service life when a percolative path of damaged cells has passed a prescribed length. The variation of service life for various scenarios, such as healing times and distribution of healing centers is investigated. Finally we show how this type of models may be useful for the design of optimized self healing materials.

[1] S. van der Zwaag (editor), (2007). *Self Healing Materials: An Alternative Approach to 20 Centuries of Materials Science*. Springer Netherlands.

John Gaddy
University of Missouri

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