Self Healing Systems

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Abstract:

In complex machines, many key components are hidden and their integrity at any given time is unknown. Failure of any one of these components can be expensive to repair and even dangerous. By designing these components to be proactive in their own preservation, one can increase a machines longevity and safety. These “active” self healing components can be broken down into two distinct stages. The first stage is damage location and assessment. This can be accomplished through anything from photo-sensors to e field sensors. Stage two is action. The damage must be repaired or at least contained. This can be accomplished through heat application or self administered epoxy. Through the course of the year we have built three distinct prototypes in order to confirm the validity of the two stage healing process. In all three prototypes tested, damage was located and repaired either by application of heat or coordinated pneumatics. This being said the prototypes designed were built on the macro scale and while they show the potential for this technology the future of active self healing systems is on molecular scale.