

Heating and cooling mechanisms for sma actuator - A brief review

ABSTRACT

Shape memory alloy (SMA) is a type of alloy with significant thermo-mechanical behavior that can be utilized as a solid-state actuator. However, the particularly useful thermo-mechanical behavior also highly non-linear and hysteretic. Making control of the SMA thermomechanical behavior exceedingly difficult. A highly controllable heating and cooling mechanism is the key factor to achieve good control of the SMA thermomechanical behavior. Thus, this paper reviewed the heating and cooling mechanism for the SMA intending to find a controllable heating and cooling mechanism for the SMA. A result from the review suggests that a mechanism with a combination of the thermoelectric module (TEM), a two-way mixing valve, and flexible tubing can offer temperature controllability for the SMA. This can be achieved by using the Peltier effect of the TEM to generate hot and cool liquid that can be channeled to the SMA in a tube through a two-way mixing valve to control the liquid temperature. Although this mechanism had been developed by the researcher, the optimization of the flexible tubing encasing the SMA to achieve maximum performance is still left poorly explore.