Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research

Joining of automotive plastics by FricRiveting

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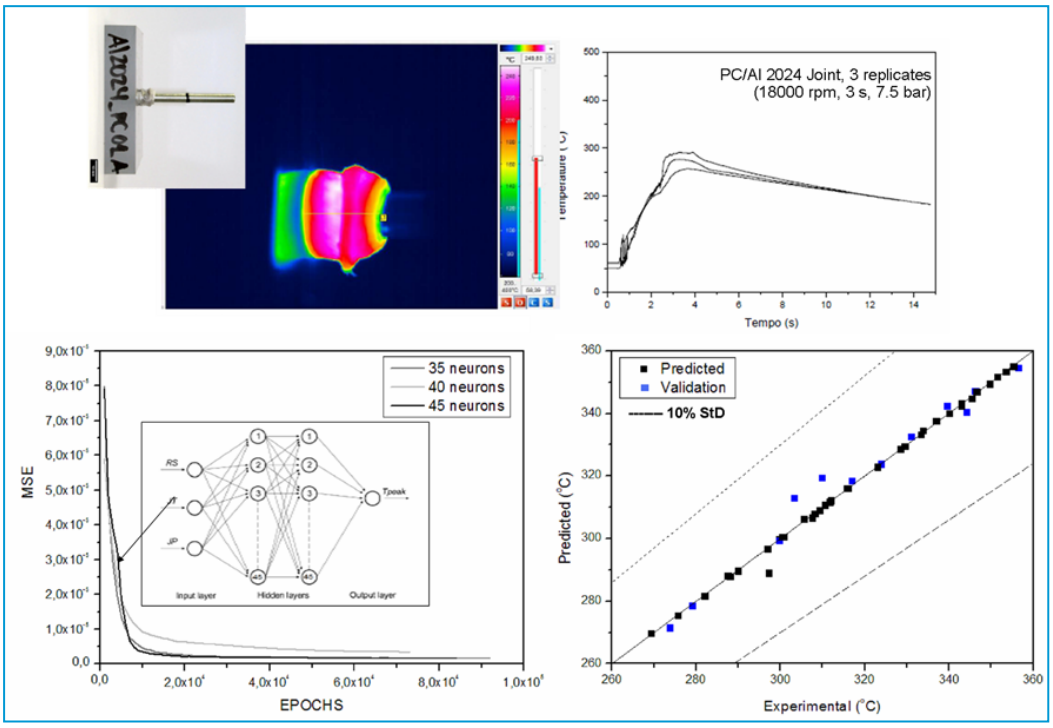
Challenge

It is well known that some thermoplastics such as polyolefin and engineering plastics are very difficult to be welded or bonded through current joining techniques. Polycarbonate (PC) is an example of these materials. PC is widely used in automotive lighting parts and is usually connected to polyolefin plastics such as PP. PC is neither miscible nor compatible to PP. Therefore they can not be usually welded to each other by traditional current welding techniques, being adhesively bonded. Adhesive bonding is normally an time consuming joining process. The new FricRiveting process developed and patented by Helmholtz-Zentrum Geesthacht could be an alternative, fast and effective technology to join lighting parts with minimal joint preparation.

Objective

The FricRiveting process of PC and PP/Aluminium specimens are being investigated by design of experiments (DOE) and analysis of variance (ANOVA) to determine the influence of the process parameters on the joint properties. Artificial neural network (ANN) is being applied to model process temperature. Model validation is carried out by experimental results obtained through thermometry and thermography at the molten polymer. Different network architectures are being tested and the best will be selected, based on smaller mean square errors (MSE) and lesser number of iterations (lesser epochs).



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