

Sag Bending

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Sag bending is a process that is used to form windshields to a specified shape using gravity. A sheet of glass is placed on a frame which has the shape of the required boundary. Differential heating is then used to control the material properties of the glass in such a way that it sags under gravity to the specified shape. The control, the heating, is constrained by an upper and a lower bound. The model which is examined is a linear elastic plate resting on the frame under the action of gravity. The control is taken to be the Young's modulus which is adjusted to minimize the L2 norm of the difference between the displacement and the target shape. I will give a short presentation of the model and of the mathematical and computational problems that arise. Analytic solutions will be presented for the simple case of an elastic beam. These indicate that the control will be discontinuous, and therefore not easily realizable physically, unless a regularising term is added to the objective function.

Co-author D Salazar Gonzalez.