

Research on Structural Optimization Design for Shield Beam of Hydraulic Support Based on Response Surface Method

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The shield beam is the main load-bearing component of the hydraulic support. The structural optimization design of one shield beam is fulfilled by the response surface method. Using the weight as the objective function, the structural optimization mathematical models of shield beam is set up. The experimental design is performed in the ANSYS software and uniform design. The maximum stresses of shield beam are gotten in the different sizes. The response surface models of design parameters and maximum stresses are fitted by the least squares method. The structural optimization design of shield beam is completed by the random direction method. This research implements the structural optimization design of hydraulic support shield beam in a modern design method, and provides a valuable guidance for the hydraulic support research and development.

Keywords: Hydraulic support, Shield beam, Structural optimization design, Response surface method