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Performance Analysis and Optimization of Reciprocating Compressor with Stepless Capacity Control System under Variable Load Conditions

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## Highlights

- A model of a reciprocating compressor under variable load conditions is developed.
- The influence of key parameters on capacity regulation performance is analyzed.
- The 360 N hydraulic force of the unloader is chosen as an optimal value.
- The displacement of 1.75mm is preferable for the unloader over that of 2 mm.
- The optimal withdraw velocity of  $1.1\text{m s}^{-1}$  is obtained to minimize the impact stress.

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