The paper includes a description of different strategies for monitoring the wear-line of a melting furnace. This monitoring is important for both economic and safety reasons.

A numerical model of the nonlinear heat conduction through the furnace lining is described. Temperature measurements at different locations are used to formulate both Dirichlet and von Neumann boundary conditions on the heat outflow boundary of the computational domain. The inner boundary is given implicitly by the special isotherm that defines the wear-line and is part of the unknown solution of the problem.

The resulting model is an inverse heat conduction problem. In the paper different solution techniques are compared, based on the sideways heat equation approach and different optimization strategies for fitting measured and computed temperatures.

Measurement data from a real melting furnace are used to validate the model and to compare the numerical solution techniques.