This thesis focuses on the problem of silent error detection in the pipelined predict-and-recompute conjugate gradient (Pipe-PR-CG) algorithm, a pipelined Krylov subspace method for solving linear systems with a symmetric positive definite matrix. The theory of silent errors and conjugate gradient variants is introduced, and the structure of Pipe-PR-CG is subsequently utilized in rounding error analysis to derive criteria for silent error detection based on bounds of several quantities computed in finite precision arithmetic. The efficacy of the criteria is then tested in a robust numerical experiment, and a fault-tolerant version of the algorithm is introduced. Additionally, the sensitivity of Pipe-PR-CG to silent errors is examined. Codes in the Python programming language which were used for the main experiments and figures presented in this thesis are also provided.