We describe two invariants of an oriented link in a closed, orientable thickened surface. The first is a finitely presented operator group in the sense of Krull and Noether, and is a generalization of the Alexander group defined by Silver and Williams for links in $S^3$. From this we derive a polynomial invariant that generalizes the Alexander polynomial. As an application, we give a lower bound for virtual genus and obstructions to invertibility of virtual links. (Received September 15, 2013)