We consider both standard and twisted action of a (real) Coxeter group G on the complement M_G to the complexified reflection hyperplanes by combining the reflections with complex conjugation. We introduce a natural geometric class of special involutions in G and give explicit formulae which describe both actions on the total cohomology H(M_G,C) in terms of these involutions. As a corollary we prove that the corresponding twisted representation is regular only for the symmetric group S_n, the Weyl groups of type D_{2m+1}, E_6 and dihedral groups I_2 (2k+1) and that the standard action has no anti-invariants. We discuss also the relations with the cohomology of generalised braid groups.