Numerous machine components are constantly subject to different magnetic fields mainly due to the environments they are in, and they show some wear process throughout their lifetime. To understand this wear process better, the effect of magnetic field on the tribological properties of AISI 4140 steel has been investigated by applying different magnetic field intensities. One of the important factors affecting the wear and friction properties of a tribological system is wear debris and their properties like chemical structure and movement between mating bodies. For this respect, magnetic field was applied on a ferromagnetic material both before and during wear tests. Then, tribological properties of the samples magnetized before the wear tests were compared with the samples to which magnetic field was applied during the tests. It was observed that samples subjected to the magnetic field during tests showed better wear resistance and lower friction coefficient values than the others as the magnetized wear debris produced during test could be removed between mating bodies by means of magnetic effect while oxidized debris were held at the rubbing interface and lowered the debris production.

Keywords: Magnetic field, wear, friction, ferromagnetic material