# Haze particles cause abrasive damage on frequently used industrial alloys

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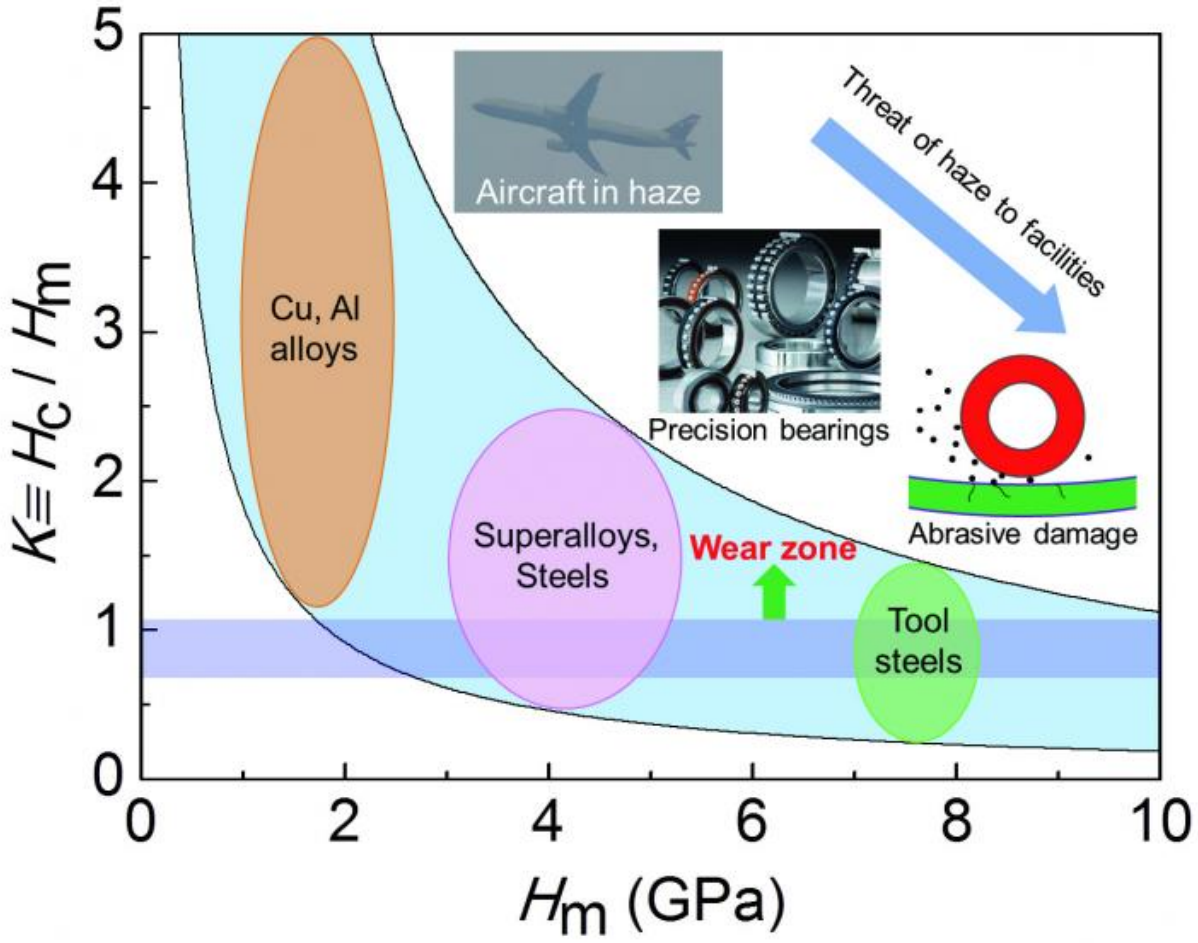


Critical criterion for haze particles to generate abrasive damage to alloys. Credit: ©Science China Press

Rapid economic growth and urbanization in developing countries are accompanied by serious particulate air pollution, i.e. haze. The haze has raised worldwide concerns regarding its impacts on visibility, human health and climate, etc. Intense efforts have been made recently to study the chemical and physical properties of haze particles. However, little effort has gone toward the mechanical properties of haze particles due to their tiny size.

By tackling a series of difficulties in collecting representative samples and employing a cutting-edge, in situ micromechanical testing system, Prof. Zhiwei Shan's research team from Xi'an Jiaotong University quantitatively investigated the mechanical properties of individual haze particles for the first time. The authors demonstrated that the compressive strength of a significant fraction of haze particles is high enough to generate abrasive damage on frequently used industrial alloys. This means that once these particles get into the gaps of the precision parts, such as gears or pistons, they will be able to generate abrasive damage and therefore reduce mechanical service life.

"Considering the heavy air pollution currently running rampant in developing countries, our findings suggest that appropriate preventive measures should be taken immediately to guard against the potential damage from haze, such as assembling the precision parts in a clean room, sealing the gap between sliding parts, and adding special filters for air 'breathing' engines," said Prof. Zhiwei Shan.

**More information:** MingShuai Ding et al. "In situ study of the mechanical properties of airborne haze particles," *Science China Technological Sciences* (2015). DOI: 10.1007/s11431-015-5935-8

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