

Bio-Inspired Passive Drag Reduction Techniques: A Review

Hayder A. Abdulbari*, Hassan D. Mohammed and Zulkefli B. Y. Hassan

Faculty of Chemical and Natural Resources Engineering, University Malaysia Pahang, Gambang
26300, Kuantan, Pahang, Malaysia

ABSTRACT

It was believed that fluid flow and the laminar to turbulent transition delay were more easily controlled on smooth surfaces until the discovery of the grooved shark skin surface that changed the whole idea of how smooth the surface should be to have high flow in submerged surfaces. Riblets have gained renewed interest in academic fields of study and in industry due to several advantages in manipulating the turbulence boundary layer. Drag reduction using small, longitudinally grooved surface provides up to 10 % lower energy consumption in several applications. This review provides an overview of the mechanism of drag reduction with riblets, the different geometries and types, and the latest developments in drag reduction riblet technology.

KEYWORDS: Drag reduction; Geometry; Riblets; Skin friction

DOI: [10.1002/cben.201400033](https://doi.org/10.1002/cben.201400033)