Super-fluent pipes
Shark skin surfaces for drag reduction

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1. Statement and Problem Definition

Statement

- Tap water is delivered via drinking water distribution pipeline system.
- Drinking water network is very extensive and consists of around 130.000 km of water mains in the Netherlands.
- This is almost 1/3 of the distance from earth to the moon.

Problem Definition

- Huge energy loss in this very extensive water distribution systems.
- Companies use pump to overcome this resistance.
- A lot of energy is required to supply water to the customers.

2. Motivation

The motivation of this research project is to develop a very low resistance water transport system to reduce friction due to the interaction between the inner surface of the pipe and water flowing through it.

The main benefits gained from this would be saving energy by lowering the required pumping power.

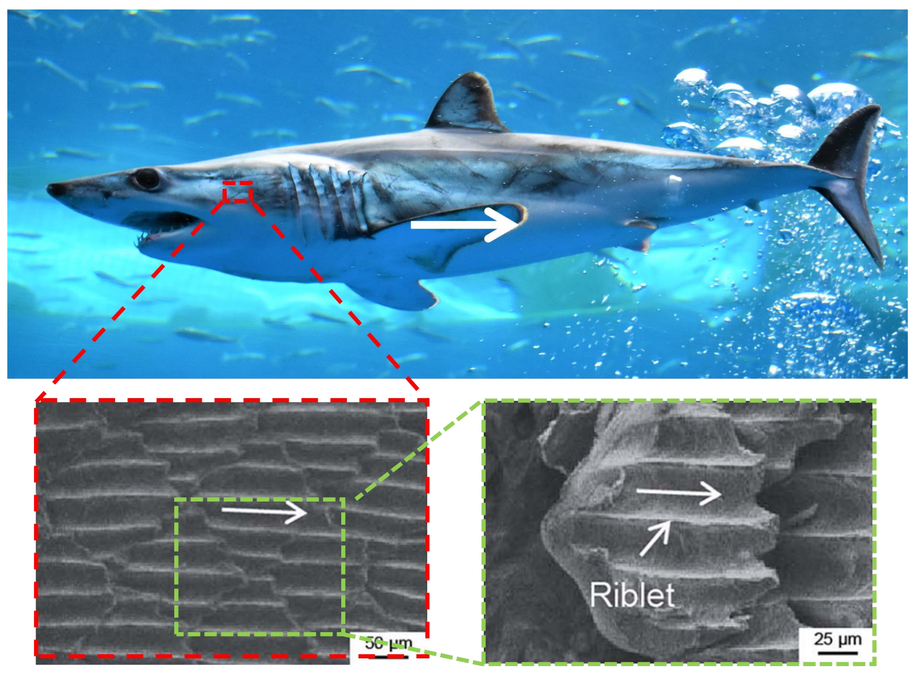
The Proposed method for drag reduction should be:

Cost effective

Durable

Nontoxic

3. Possible Solution



The riblet structures on the skin of fast swimming sharks reduce skin friction drag in the turbulent flow regime allowing them to swim faster.

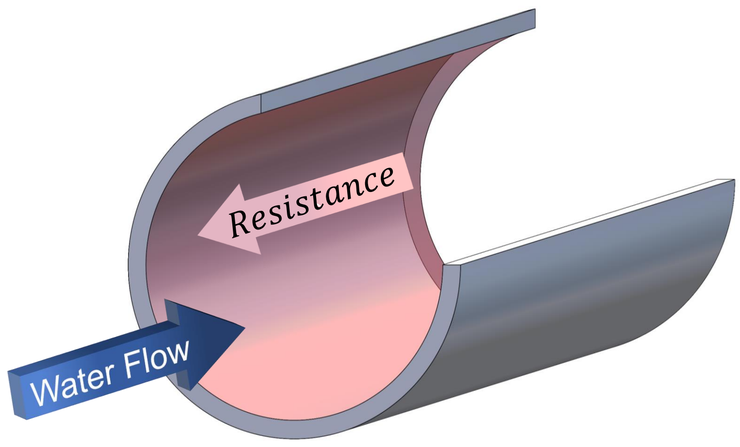
4. Research Question

Main-Research Questions

- Are the riblets effective in pipes for drag reduction?

Sub-Research Questions

- How can the riblets be fabricated inside pipes?
- To what extent can the riblets reduce the drag?
- What are the correlations between the geometrical properties of the riblets and fluid flow?



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