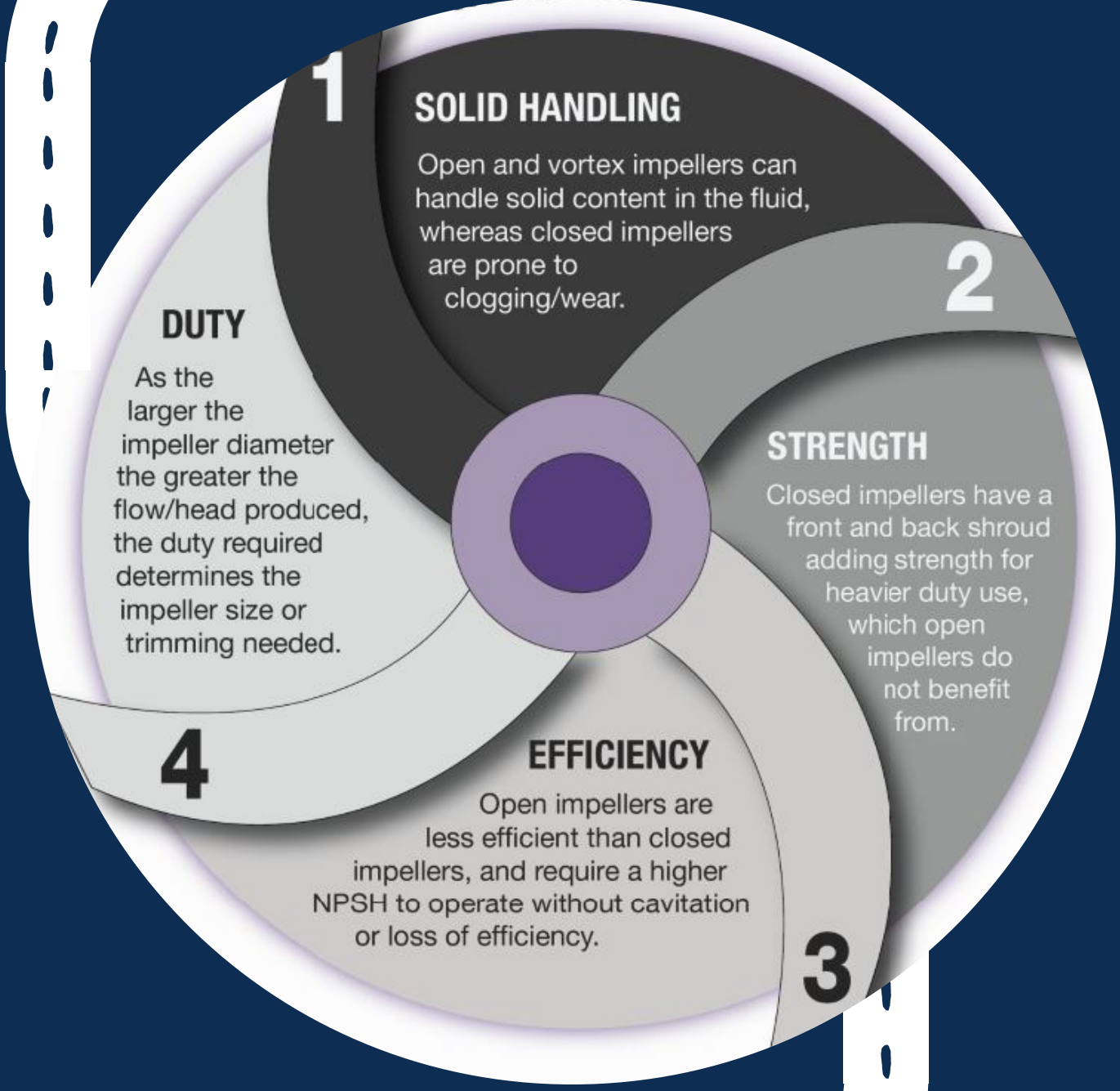
THE IMPORTANCE OF A WATER PUMP IMPELLER

6 WHAT DOES THE WATER PUMP IMPELLER DO?

In a water pump, the impeller is the part that distributes coolant throughout the cooling system of the vehicle. And it must be properly designed to provide the correct system pressure for all driving conditions.

The rotating vanes on this small, round disc assist in moving the coolant through the cooling circuit and thus cool the vehicle's engine. When this component fails, the coolant supply is cut off, causing the engine to overheat. As you know, the health and efficiency of your vehicle's engine requires an optimal temperature. Without it, it could cause serious and irreparable damage.

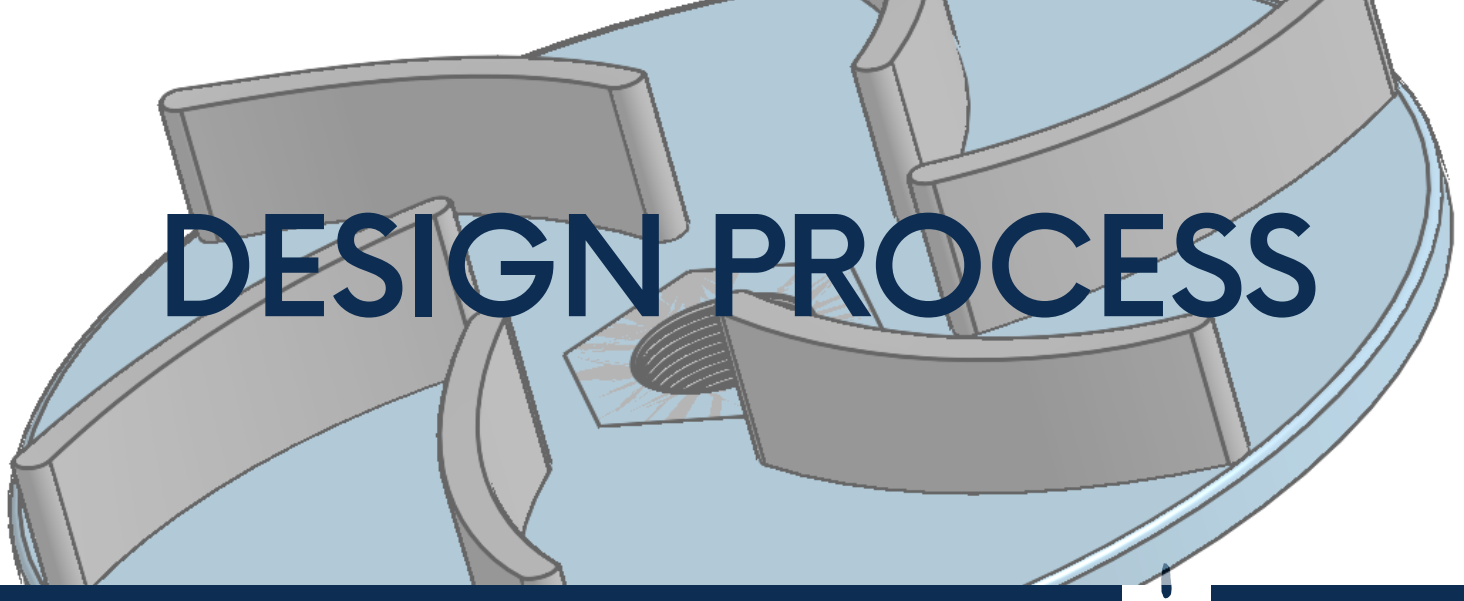
The impeller is made up of several curved blades. The coolant flows through the turbine along its axis and escapes between the fins along the circumference.



5 HOW TO KNOW IF AN IMPELLER IS MALFUNCTIONING?

If your impeller fails, the pump will be unable to provide coolant to the engine, causing it to overheat. You may be able toavoid serious difficulties if you notice that your water pump is failing early on. However, if you overlook a bad impeller in time, the consequences might be disastrous for your engine. There are five symptoms that your cooling system needs attention.

- Pump leakage
- Slow re-priming
- Unusual noises or vibrations
- Overheating
- Reduced pump flow



DESIGN PROCESS

1 INVESTIGATIONS

The use of centrifugal pumps as turbines in the recent years has come as a boon to small and micro power application given its simplicity and robustness. However, attempts are continuously being made to improve the performance by modifying the geometry, and yet to retain its simpleness. This paper proposes a new design to the impeller of an existing pump with forward-

2 COMPARATIVE

In this study, the blade channel number influence on the flow stability in a centrifugal pump impeller was studied by unsteady flow simulations after numerical-experimental verification. The 5-, 6-, and 7-blade impellers were discussed under the same partial-load flow rate condition and the same rotating speed.

3 SOLIDWORKS

Intuitive 3D design and product development solutions from SOLIDWORKS help you conceptualize, create, validate, communicate, manage

4 PROTOTYPE

This paper presents the results of FEM (Finite Element Method), CFD (Computational Fluid Dynamics) and modal analyses of model semi-axial pump. Two sets of impeller blades were printed by 3D printing technology

5 PRINTED BLADES

The 3D printed blades can be produced very quickly and with accurate blade surface finish. One of the reasons of this approach can be the use of 3D printed blades as spare parts for industrial applications or for model pump research.

HIRECHE
Office for Industrial Project Study