

FP, AP or CP Propeller?

Conventional propellers are delivered in three different pitch designs: fixed, adjustable or controllable pitch.

The **fixed pitch propeller (FPP)** is normally casted as one single block. This is the cheapest type, and, if correctly designed and if run only on the operational point, it has the best efficiency of the three designs. Also, lack of moving parts makes it a reliable design, requiring little maintenance.



The FPP is mainly used on:

1. small vessels with restricted budget
2. small vessels with reversing gear
3. high speed vessels with very high propeller load
4. larger vessels with one dominating operational mode, i.e. ocean going cargo vessels

The **controllable pitch propeller (CPP)** has rotatable blades which are controlled by either a rod running through the propeller shaft (mainly small vessels), or through a servo system built into the propeller hub (larger vessels).



The price is significantly higher than for the FPP, but the CPP offers a number of advantages:

- Significantly improved overall efficiency at varying load and/or varying speed conditions
- Better manoeuvrability (acceleration, breaking, crash stop)
- Allows reversing without reversing gear/reversing engine.
- Better performance at reversing
- Better operational conditions for engine, gear, shaft and bearings, especially at low speed
- Forgiving for design errors
- No risk for engine overload if the propeller is fouled or when the engine gets worn down
- Each blade may be changed independently if damaged
- Future-proof with regard to changes of use of the vessel, extensions, etc.

The CPP is mainly used on vessels with varying load or running on varying speed, i.e.:

1. Short Sea Shipping vessels
2. ferries
3. fishing vessels
4. offshore vessels
5. high speed vessels with normal propeller load
6. patrol vessels
7. rescue vessels
8. research vessels

The **adjustable pitch propeller (APP)** operates as an FPP, but the pitch may be adjusted manually with an adjustment screw located on the propeller hub. The APP is more expensive than the FPP, but cheaper than the CPP as there is no servo system.



The APP has brought the following advantages from the CPP:

- Forgiving for design errors
- The pitch may be adjusted to correspond to the power when engine is worn down
- Each blade may be changed independently if damaged
- Future-proof with regard to changes of use of the vessel, extension of the vessel etc.

The APP may be used on any vessel where flexibility of pitch setting would be favourable.



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