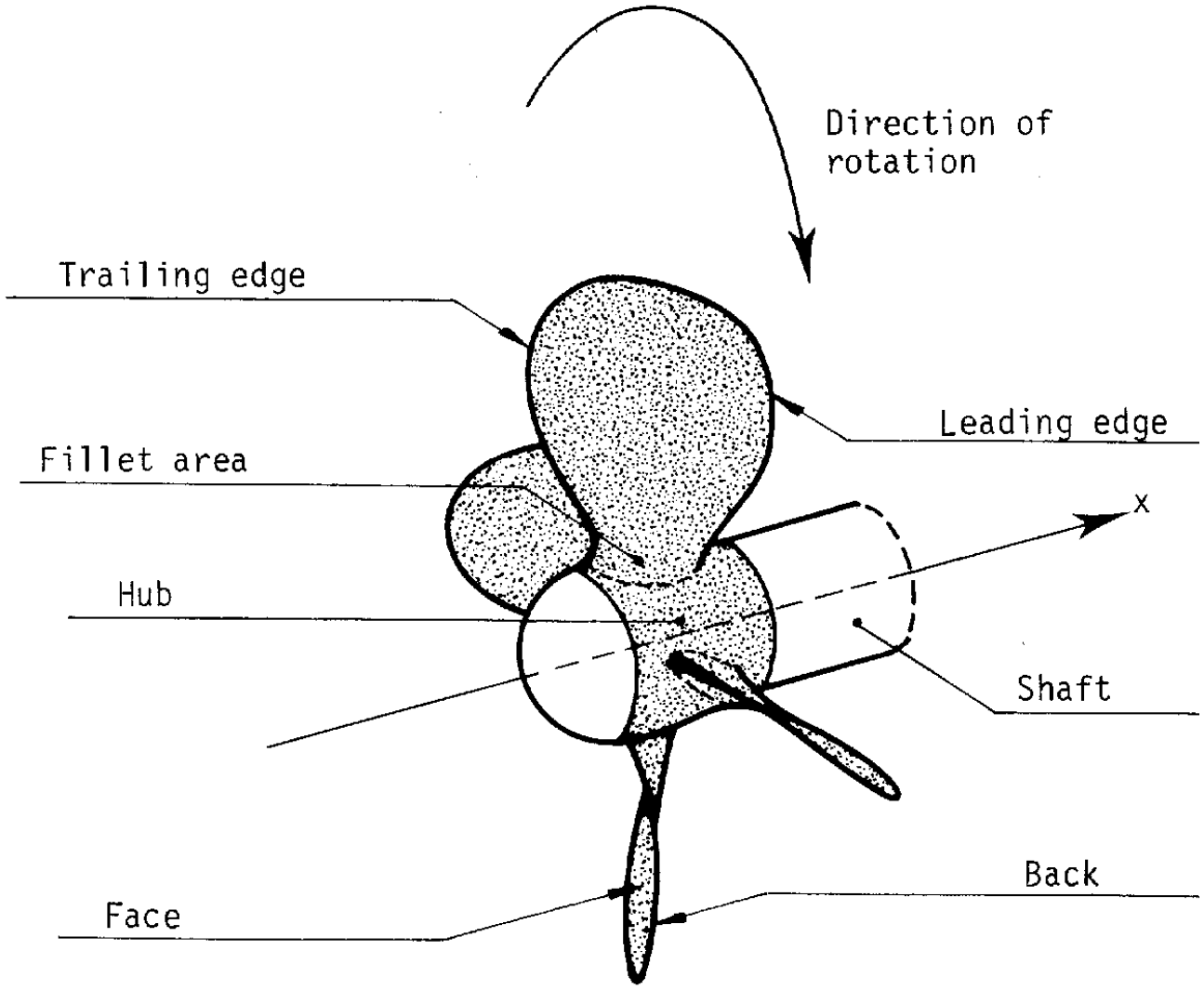
Propeller geometrie definitie – Waar kunst overgaat in techniek

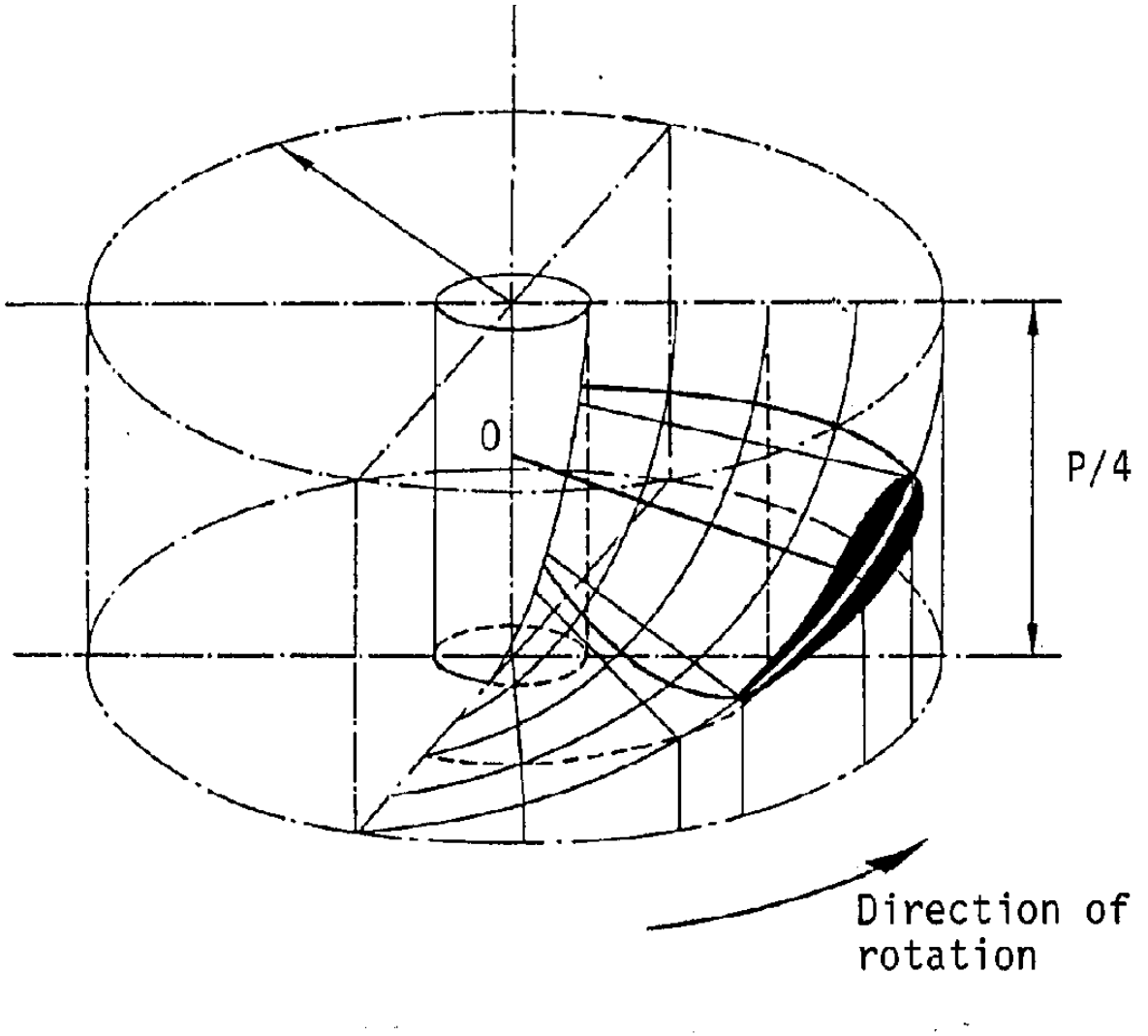
Propeller Geometry

General Outline:

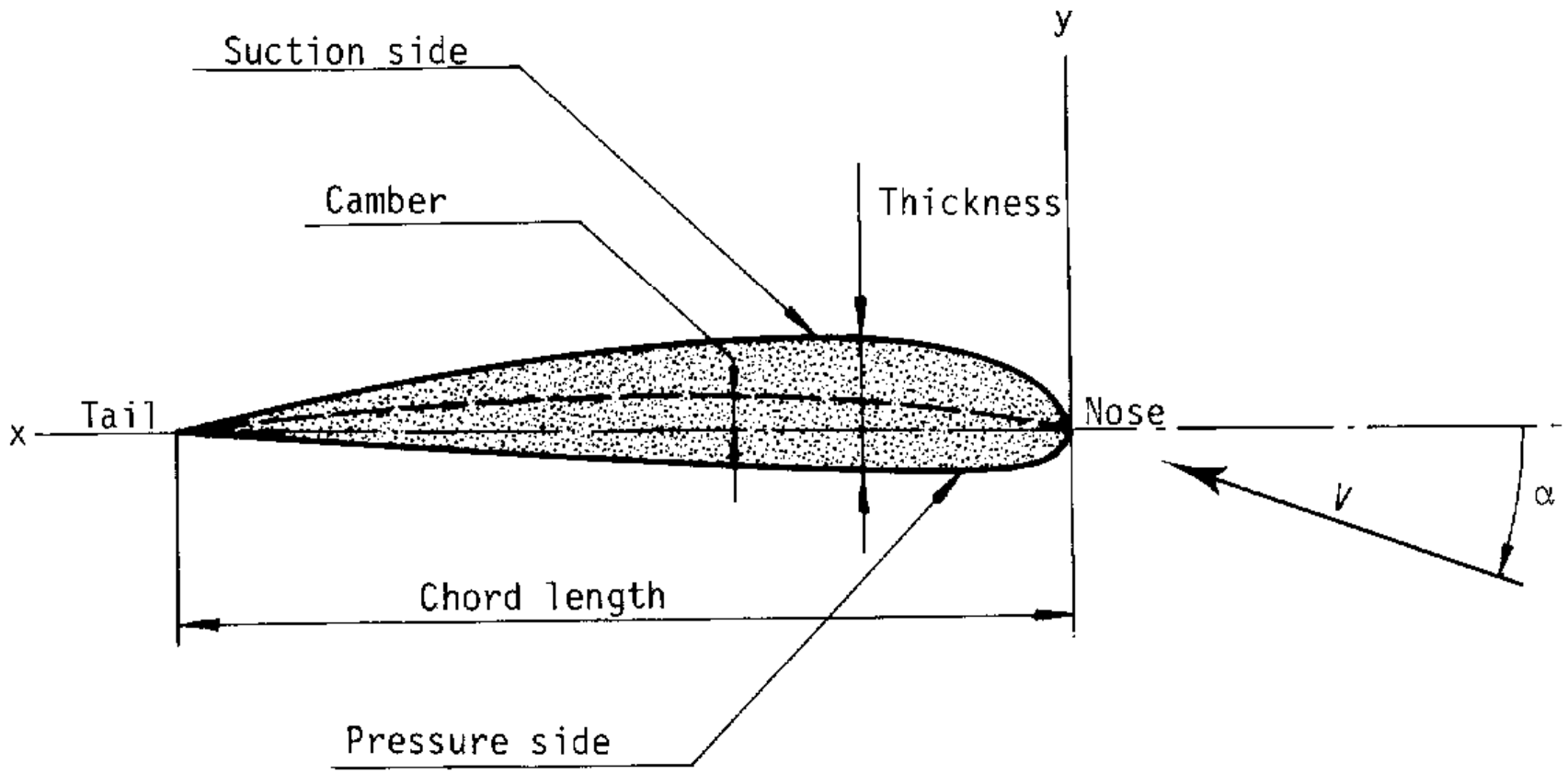


Cylindrical cross section of propeller blade

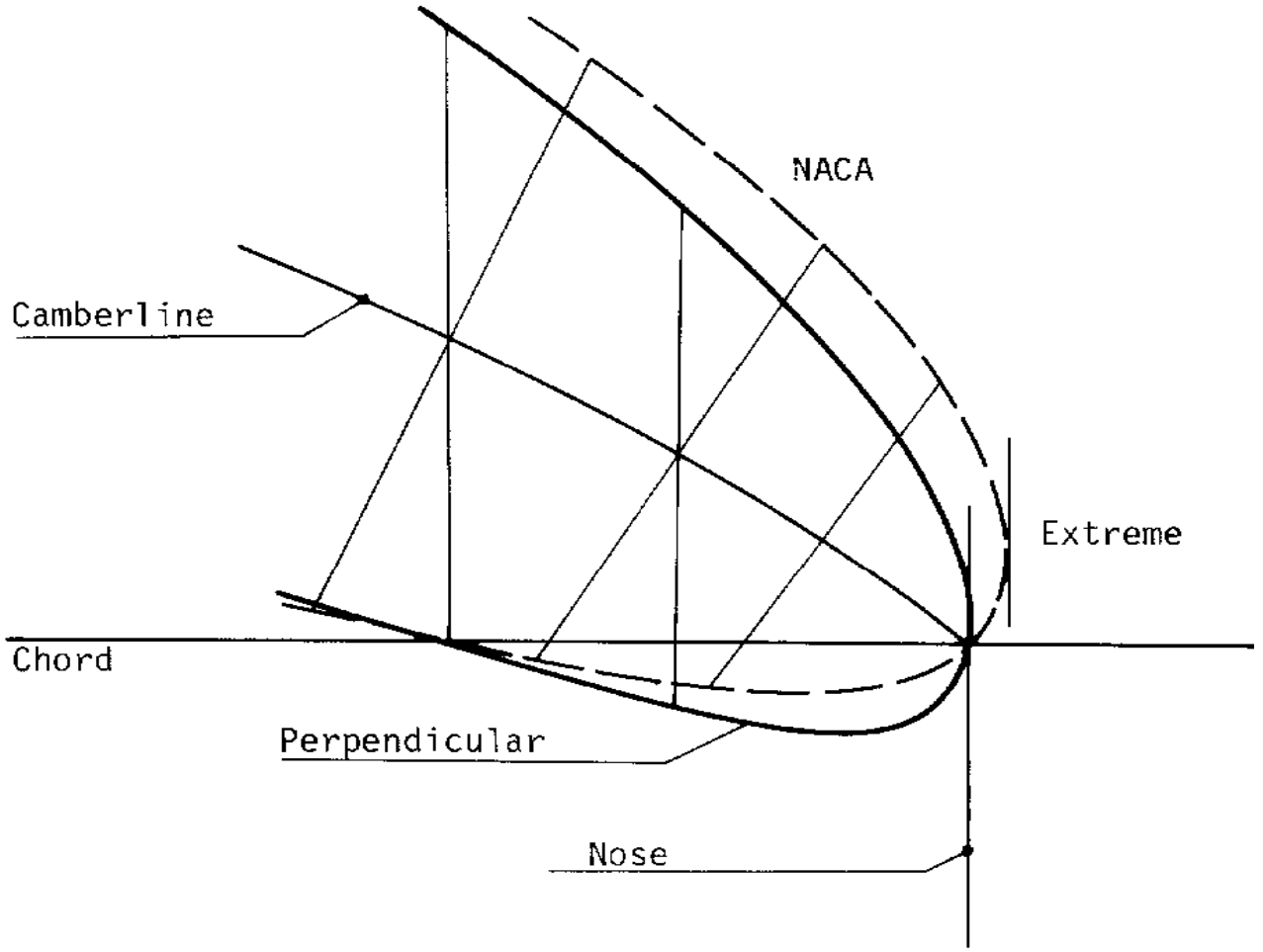
Propeller reference plane: perpendicular to shaft, through midchord of root section



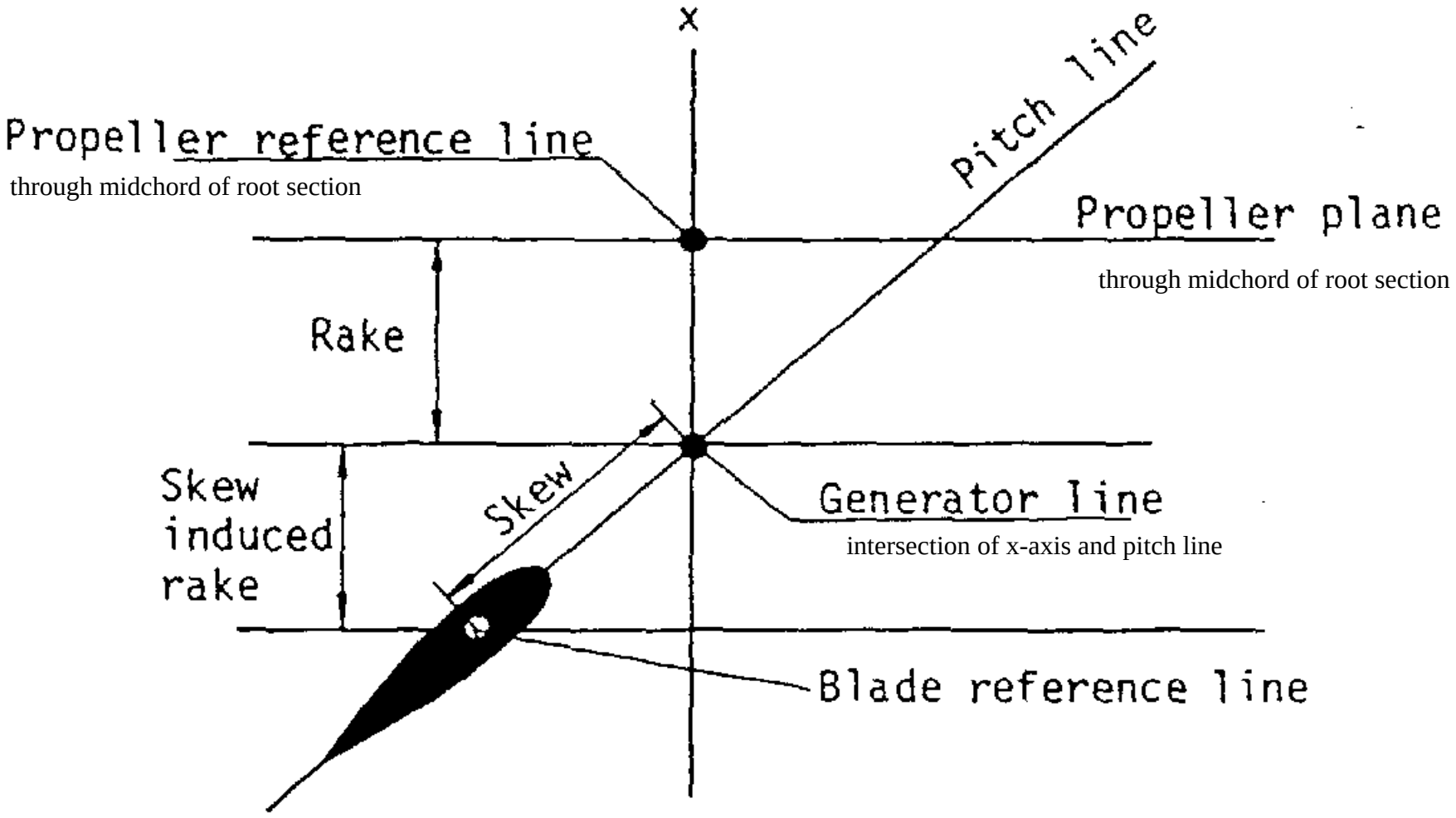
Geometry of propeller blade section



Different definitions of camber and pitch

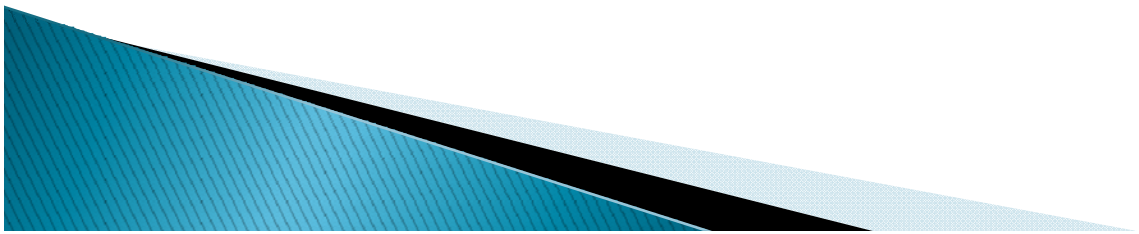


Expanded cylindrical cross section of propeller



Most important propeller parameters

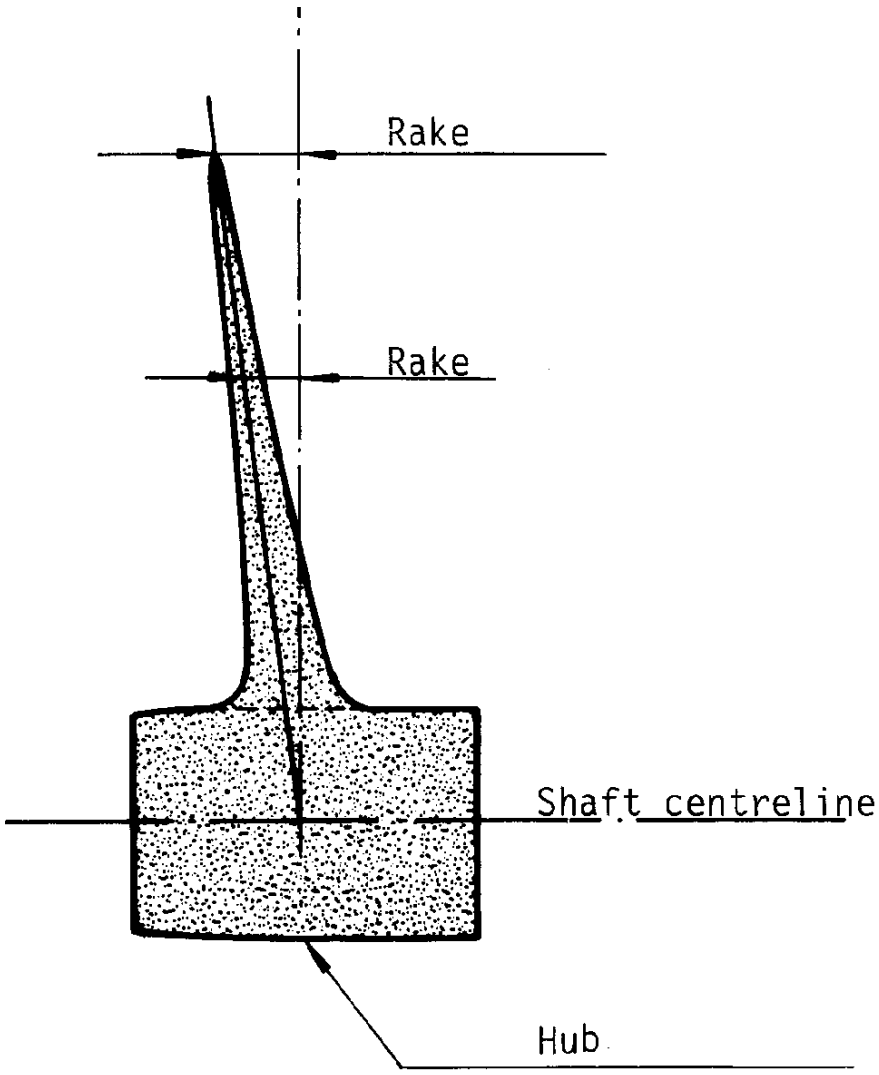
- Diameter
- Pitch, Blade Area Ratio, Number of Blades
  - See also B-series designation e.g. B4.70
- Pitch and Camber



Longitudinal cross section of a propeller with rake

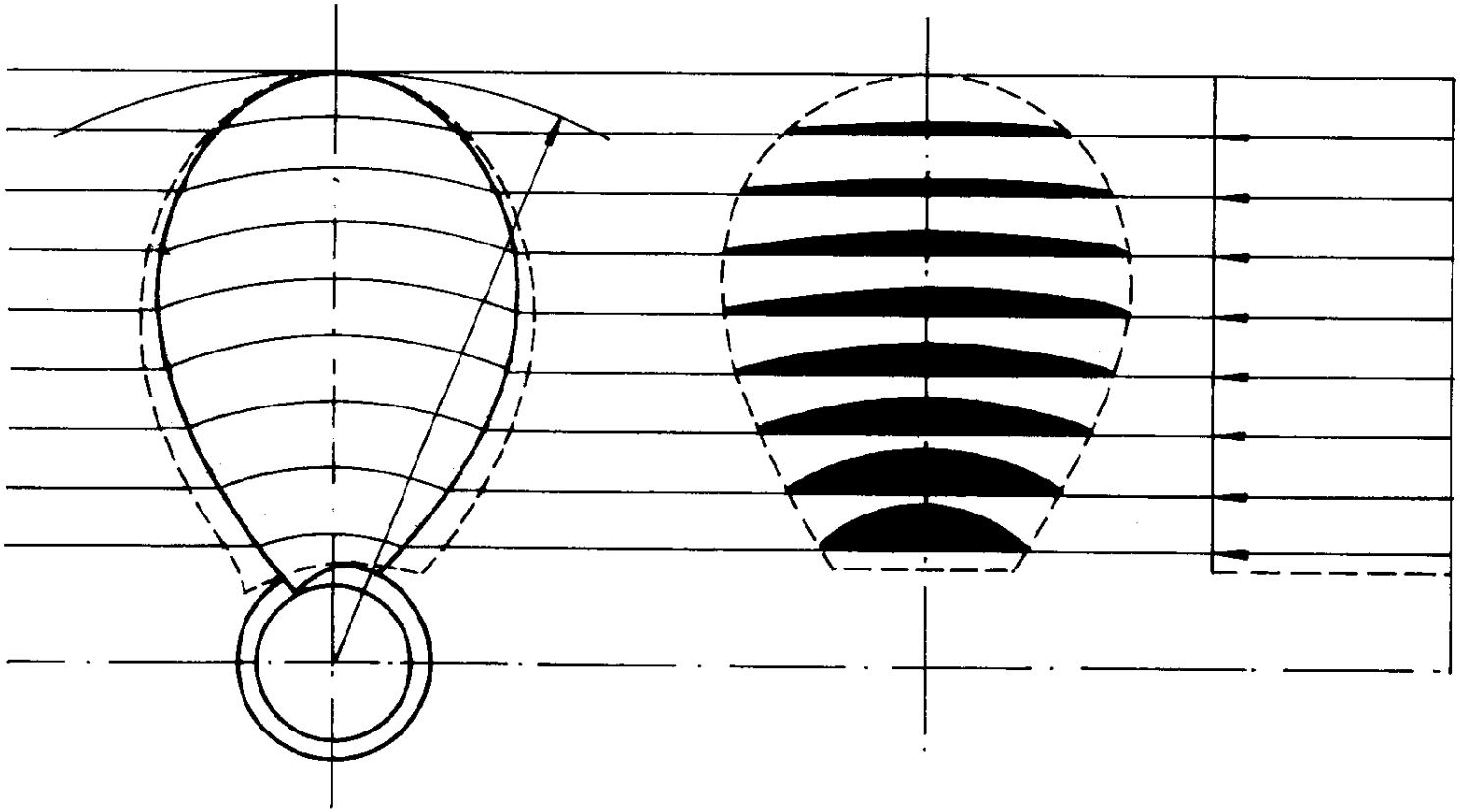
Effects of rake:

- change in wetted surface
- change in effective diameter of streamtube
- change in prop-hull clearance
- notice def. of thickness



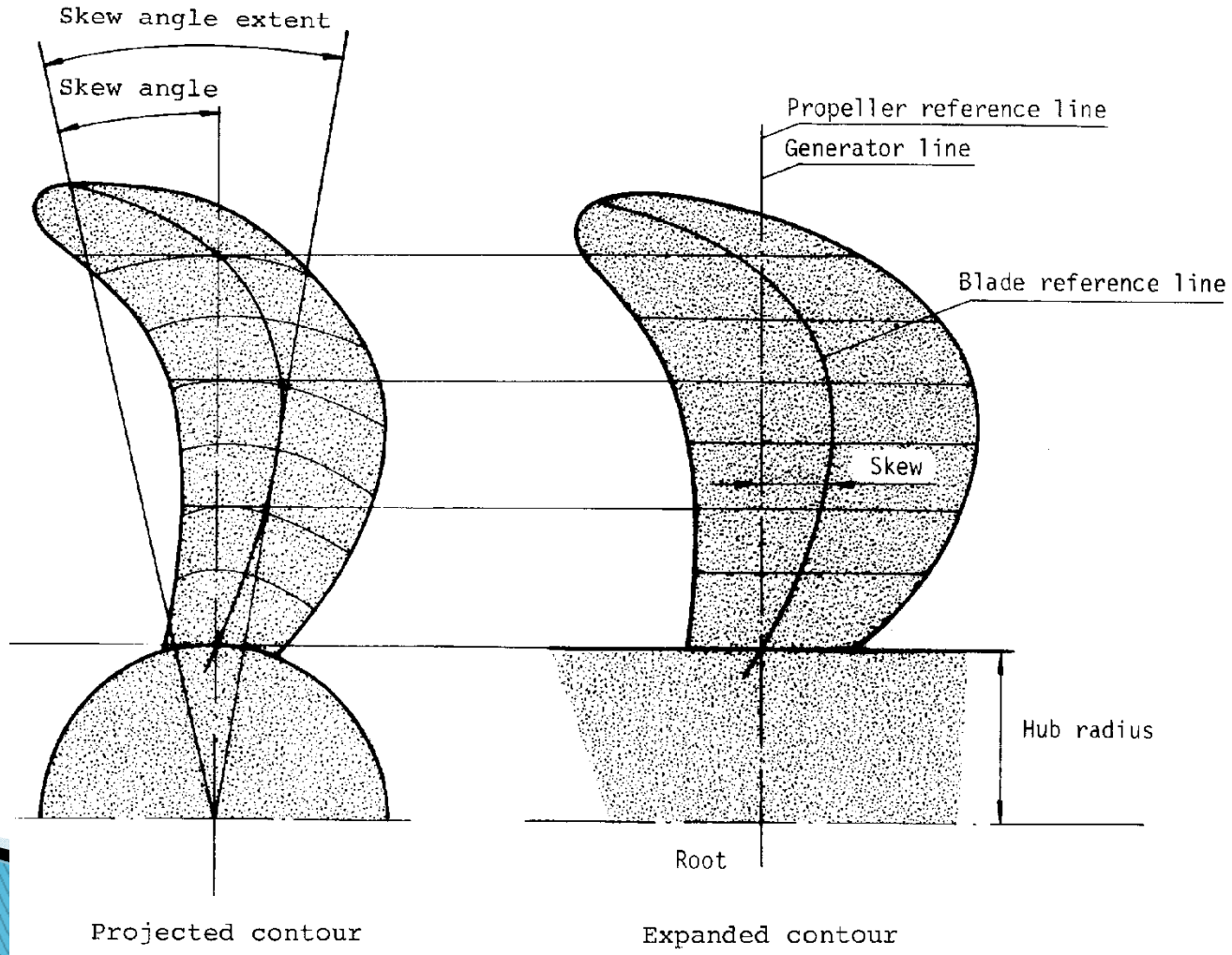
Contours and blade areas

Expanded blade contours matters hydrodynamically: Ae/A0 or Ap/A0



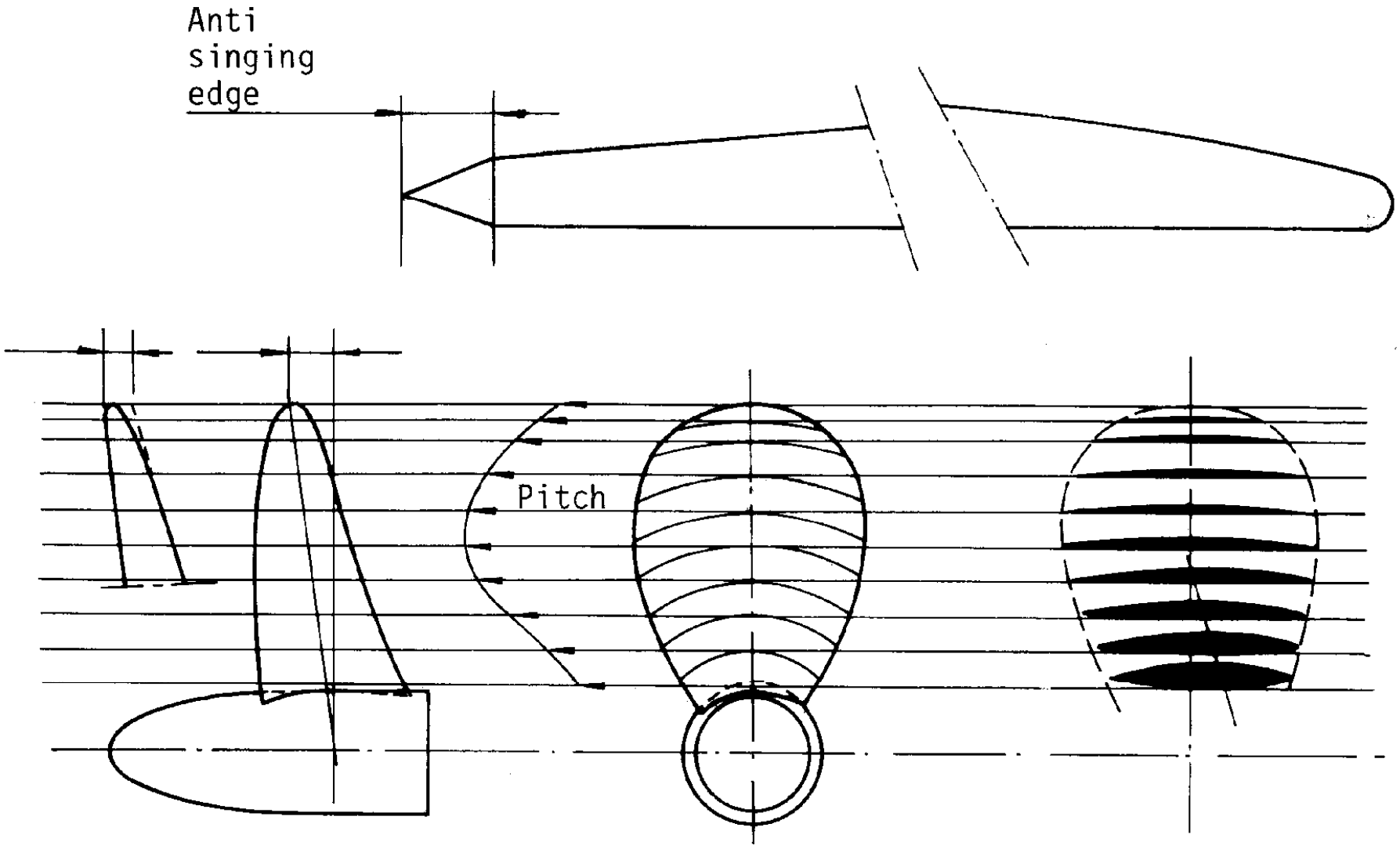
a. Projected and developed area b. Expanded area

Projected and expanded contour of propeller with skew

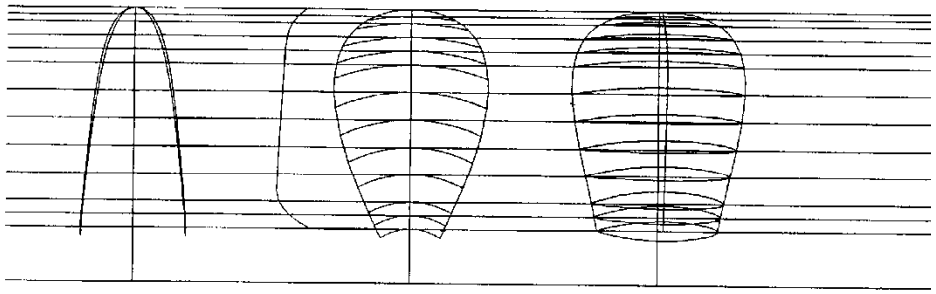



Skew

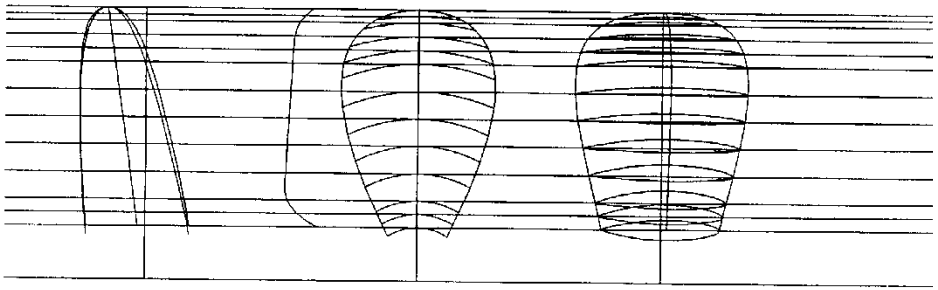
Example of a propeller drawing



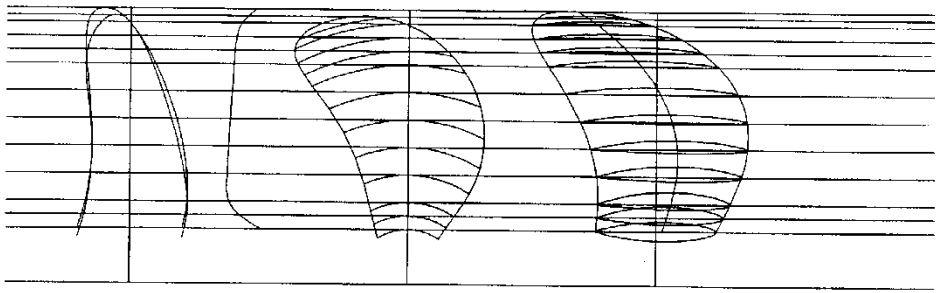
Effects of skew and rake in a propeller drawing



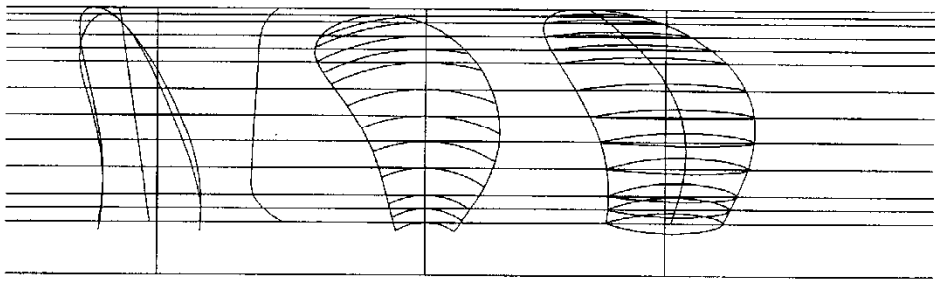
Without skew and rake



With rake



With skew



With skew and rake

Propeller design

- Series open water characteristics for parametric design
- Lifting line
- Systematic variation of parameters and analysis
- Optimization techniques (e.g. steepest gradient, genetic algorithms)