

2. THEORY

The major part of the sound emitted from a cavitation process is due to the changes in volume of the individual cavitation bubbles [5]. This volume change is caused by pressure variations in the liquid. For propellers operating behind a vessel, the bubbles generally pass through a pressure well induced by the propeller where the pressure may drop below the vapour pressure. This causes a bubble expansion to some maximum radius R_0 , followed by a rapid reduction of the volume, as shown in Fig. 1. The pressure well generally has its minimum when the propeller blade passes through its top point.

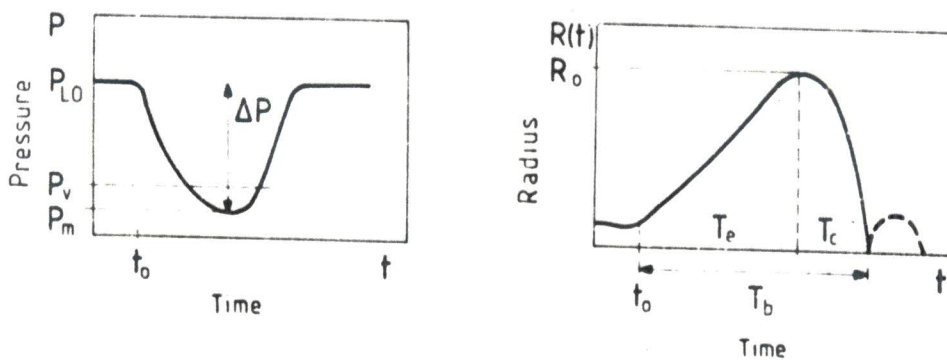


Fig. 1: General pressure and bubble radius variation.

In the figure the following notations are used:

- P_{LO} is the equilibrium pressure in the liquid
- P_v is the vapour pressure
- P_m is the minimum pressure
- T_e is the expansion time of the bubble
- T_c is the collapse time of the bubble