

Appendix A: Terminology

- Aerodynamic admittance** Transfer function relating the gust spectral density to the spectral density of an aerodynamic force (Sections 5.3, 5.3.1, 12.3.3)
- Aerodynamic damping** Aerodynamic forces proportional to the velocity of a structure, and additional to (or subtractive from) the structural damping (Section 5.5.1)
- Background response** That part of dynamic response to wind excluding the effects of resonant amplifications
- Bernoulli's equation** Equation describing irrotational and inviscid fluid flow (Section 4.2.1)
- Blockage effect** Distortion effect of wind tunnel walls on measurements, particularly force and pressure measurements (Section 7.7)
- Bluff body** Body with a large frontal dimension, from which the airflow separates
- Body axes** Axes defined by the body or structure (Section 4.2.2)
- Boundary layer** Region of reduced air velocities near the ground or the surface of a body. (Section 3.1)
- Cauchy number** Ratio of internal forces in a structure to inertial forces in the air (Chapter 7)
- Coriolis force** Apparent force on moving air due to the rotation of the earth
- Correlation** Statistical relationship between two fluctuating random variables (Section 3.3.5)
- Downburst** Severe downdraft of air occurring in thunderstorms (Section 1.3.5)
- Drag** Along-wind force
- Dynamic response factor** Ratio of expected maximum structural response including resonant and correlation effects, to that ignoring both effects (Section 5.3.4)
- Ekman spiral** Turning effect of the wind vector with height in the atmospheric boundary layer (Chapter 3)
- Flutter** One-, or two-, degree-of-freedom aeroelastic instability, involving rotational motion (Section 5.5.3)
- Friction velocity** Non-dimensional measure of surface shear stress (Section 3.2.1)
- Froude number** Ratio of inertial forces in the air to gravity forces (Chapter 7)
- Galloping** Single-degree-of-freedom translational aeroelastic instability (Section 5.5.2)
- Geostrophic drag coefficient** Ratio of friction velocity to geostrophic wind speed (Section 3.2.4)
- Gradient wind** Upper level wind that can be calculated from the gradient wind equation (Section 1.2.4)
- Gust factor** Ratio of expected maximum to mean value of wind speed, pressure or force
- Gust response factor** Ratio of expected maximum to mean structural response (Section 5.3.2)

Helmholtz resonance Resonance in internal pressure fluctuations associated with the compressibility of the air within a building, and the mass of air moving in and out of a dominant opening

Inviscid Fluid flow in which the effects of viscosity are non-existent or negligible

Isotach Contour of constant basic design wind speed

Jensen number Ratio of building dimension (usually height) to roughness length in atmospheric boundary-layer flow (Section 4.4.5)

Lift Cross-wind force, usually but not necessarily, vertical

Limit states design A method of structural design, which separately considers structural failure through collapse or overturning, from the functional (serviceability) aspects

Lock-in The enhancement of fluctuating forces produced by vortex shedding due to the motion of the vibrating body (Section 5.5.4)

Logarithmic law A mathematical representation of the profile of mean velocity with height in the lower part of the atmospheric boundary layer

Manifold A device for averaging pressure measurements from several measurement positions (Section 7.5.2)

Mechanical admittance Transfer function relating the spectral density of aerodynamic forces to the spectral density of structural response (Section 5.3.1)

Peak factor Ratio of maximum minus mean value, to standard deviation, for wind velocity, pressure, force or response (Section 5.3.3)

Peak gust Maximum value of wind speed in a defined time period

Pressure coefficient Surface pressure made non-dimensional by the dynamic pressure in the wind flow (Section 4.2.1)

Quasi-steady A model of wind loading that assumes that wind pressures on buildings fluctuate directly with the fluctuations in wind speed immediately upstream

Return period Inverse of probability of exceedence of an extreme value ([Chapter 2](#))

Reynolds number Ratio of inertial forces to viscous forces in fluid flow (Section 4.2.4)

Roughness length A measure of the aerodynamic roughness of a surface, which affects the boundary-layer flow over it (Section 3.2.1)

Safety index A measure of probability of failure of a structure. ‘Reliability Index’ is also used (Section 2.6.2)

Scruton number A non-dimensional parameter incorporating the ratio of structural mass to fluid mass, and structural damping, which is a measure of the propensity of a structure to resonant dynamic response (Section 11.5.1)

Shear stress (fluid flow) The force per unit area exerted by a layer of moving fluid on the adjacent layer

Spectral density A measure of the contribution to a fluctuating quantity (e.g. wind velocity, wind pressure, deflection) within a defined frequency bandwidth

Stagnation point Point on a body where the approaching flow is brought to rest

Stationary Description of a random process whose statistical properties do not change with time

Strouhal number Non-dimensional vortex-shedding frequency (Section 4.6.3)

Synoptic winds Winds created by large scale meteorological systems, especially gales produced by extratropical depressions

Thunderstorm Thermally driven local storm capable of producing strong downdraft winds (Section 1.3.3)

Tornado Local intense storm formed from thunderclouds, with intense winds rotating around a vortex structure (Section 1.3.4)

- Tropical cyclone** An intense tropical storm which can occur over warm tropical oceans. A generic name which incorporates ‘hurricane’ (used for Caribbean and north-west Atlantic storms) and ‘typhoon’ (used in the north-west Pacific) (Section 1.3.2)
- Turbulence** Fluctuations in fluid flow. In meteorology and wind engineering the term ‘gustiness’ is also used
- von Karman’s constant** Dimensionless constant in the logarithmic law for the profile of mean velocity in a turbulent boundary layer
- Vortex shedding** The periodic shedding of eddies formed from the rolling-up of the boundary shed from a bluff body
- Wake** The region of low velocity and turbulent flow in the region downstream of a body
- Wind axes** Axes parallel and normal to the mean wind direction (Section 4.2.2)