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The International Association for Wind Engineering (IAWE): Progress and prospects

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Abstract

The International Association for Wind Engineering (IAWE) was born in 1975, at the 4th International Conference on Wind Engineering (ICWE), London, UK, in a pioneering stage of wind engineering. It operated, mostly informally, until 1999, when the IAWE Steering Committee Meeting at the 10th ICWE, Copenhagen, Denmark, decided to open a wide debate and study new tools to make the IAWE coherent with the impressive development in wind engineering. Following this decision, new IAWE by-laws were compiled and a renewed organisation was proposed to and accepted by the Steering Committee Meeting at the 11th ICWE, Lubbock, TX, 2003. This decision promoted several actions aimed at offering the international wind engineering community a more operative and efficient service and support. In particular, an Executive Board was constituted to drive the Association and its activities between two subsequent ICWEs; a Secretariat was established to administer the IAWE and to represent a reference point for the wind engineering community; several associations and societies were accepted into IAWE membership, and a wide network of links and cooperations was created among member organisations, supporting members and other individual contacts spread to all parts of the world; the official IAWE web site—www.iawe.org—was created; renewed liaisons were made operative with international organisations working in wind engineering and similar fields; IAWE Awards were instituted in the broad field of wind engineering; a better sequence of dates and venues of the most important wind engineering conferences was planned. This paper provides a general framework and some critical remarks on the progress and the prospects of the IAWE.

Keywords: International Association for Wind Engineering; International Conference on Wind Engineering; Journal of Wind Engineering and Industrial Aerodynamics; Wind Engineering

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1. Wind engineering

Few natural phenomena have attracted as much speculation, observation, experience, research, applications and technologies as those developed with reference to wind over the course of the centuries. This bountiful activity, the evolution of wind culture, and the capability of mankind to exploit beneficial wind aspects and protect itself from the prejudicial ones, may be framed in four periods (Cermak, 1975).

In the first period, from the dawning of civilisation to the Renaissance, wind culture was first characterised by a mythological view, then inspired by a speculative approach partially based on observation. With such conditions, the first meteorological forecasts were dominated by tradition and by astrological practice. Wind was exploited to sail on rivers, seas and oceans, to sustain the flight of kites and to extract energy from the atmosphere by rudimental windmills. The human race also developed the first experiences to guarantee the bioclimatic comfort of towns and of houses. On the other hand, it usually observed the devastation caused by wind storms with resignation.

During the second period, from the 16th century to the end of the 19th century, a new form of knowledge based on experience, science, supplanted speculation and observation. The culture of wind availed itself of such progress, drawing its still fundamental concepts and principles, from the basic disciplines born and developed in these years, especially mathematics and probability theory, theoretical and applied mechanics, construction, music, sound and vibration sciences, fluid dynamics and thermodynamics, electricity and magnetism. Thanks to such disciplines and to the enormous progress in the sectors of sailing and flight, a renewed culture of meteorology, aerodynamics and wind energy grew. Moreover, architects and engineers began to become acquainted with the risks involved with slender and light structures, observing the collapse of a long series of cable-stayed, suspension and truss bridges.

In the course of the third period, from the end of the 19th century to the middle of the 20th century, the basic disciplines from which wind science draws its principles, especially fluid dynamics and probability theory, completed their ripening. Furthermore, the dawning and bursting progress of computer science offered wind a new tool destined to be a basic wind resource. Contemporarily, new channels of knowledge developed concerning aeolic phenomena, aerodynamics, the actions and effects of wind on environment and constructions. The knowledge of aeolic phenomena drew its maximum impulse from the progress of traditional and remote instrumentation, the growth of meteorology, the birth of micrometeorology, turbulence theory, planetary boundary layer modelling and climatology. Aerodynamics exhibited great progress in the experimental sector, due to the spread of field and full-scale measurements and, above all, of wind tunnel facilities; their culture pervaded the sectors of aeronautics, sailing, roadway and railway transportation, wind turbines and structures, opening unexpected horizons and prospects. Environmental wind actions and effects received increasing attention with reference to the atmospheric dispersion of pollutants, spreading of fire, wind erosion and soil transportation, snow drifting, agriculture protection, urban planning and architectural design inspired by bioclimatic concepts. The study of wind actions and effects on structures drew impetus from the realisation of long and light bridges, of tall and slender towers and buildings, and, even more, of a new generation of wind-sensitive structures; moreover, thanks also to the growing meteorological culture, mankind realised that aeolic