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Aircraft icing: an ongoing threat to aviation safety

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ABSTRACT

Flight safety is undoubtedly the most important requirement for modern aircraft design and operation. However, in reality, aircraft flight performance and safety are inevitably affected by adverse meteorological conditions, one such weather is icing. Aircraft icing can cause severe aerodynamic and flight mechanical effects, thus threatens aircraft flight safety. In this paper, a comprehensive review of the past research on aircraft icing is presented. Special attentions are paid in the following aspects. First, the causes, types, severity and natural parameters of aircraft icing are introduced. Then, the various effects of ice accretion on aircraft aerodynamic performance, stability, controllability as well as the existing estimation methods are summarized and analyzed. Following is a simple introduction to the recently rising issue on supercooled large droplet (SLD) icing. Finally, a series of aircraft flight accidents caused by icing in recent years are analyzed. The previous lessons should be accepted and disseminated by later generations to avoid accidents by aircraft icing.

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