

1. Explanation of the collapse of Terminal 2E at Roissy–CDG Airport by nonlinear deterministic and reliability analyses *(Open Access)*

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Abstract: The collapse of Terminal 2E Roissy at Charles de Gaulle Airport that failed eleven months after its inauguration in 2004 and left four casualties is investigated in this paper by performing deterministic and reliability analyses using the finite element software Ansys. The aim of this study is to assess the accuracy of the terminal design by comparing the calculated reinforcement ratio required with the existing ratio and to evaluate the reliability of Terminal 2E to know if the collapse could be predicted during the design phase. Reliability analysis is performed using a combination of Response Surface Method (RSM) and Monte Carlo Simulation (MCS) and taking into account the nonlinear properties of material and the complexity of geometry to investigate the nonlinear behavior of the structure in order to reduce computational costs and obtain reliable results. Moreover, sensitivity analysis is performed to determine the effects of the uncertainties on the long term deflection in order to investigate the causes of the failure. © 2019 The Authors (33 refs)

Main heading: Reliability analysis

Controlled terms: Computational geometry - Computer system recovery - Intelligent systems - Monte Carlo methods - Nonlinear analysis - Reinforced concrete - Sensitivity analysis - Software reliability - Surface properties - Uncertainty analysis

Uncontrolled terms: Computational costs - Finite element software - Long-term deflections - Nonlinear behavior - Nonlinear properties - Reinforcement ratios - Reliable results - Response surface method

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