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## **THE HAZARD DUE TO ABANDONED SALT MINE CAVITIES IN THE UK**

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### **Abstract**

Salt has been mined historically in a number of areas in the UK. However, the majority of mining in the 19th and early part of the 20th centuries was undertaken in the area around Northwich in Cheshire and Carrickfergus in Antrim (Northern Ireland). In the Northwich field 29 mines were excavated in the lower salt bed between 1780 and 1928 and in Carrickfergus eight were mined from 1850 to about 1940. Nearly all these mines were excavated using room-and-pillar techniques, generally using the maximum extraction ratios that could be achieved without causing immediate collapse. This meant that the short-term stability of these mine cavities had very little margin of safety, to say nothing of the longer term.

Inevitably, a number of mines have collapsed over the past 100 years, most recently at Carrickfergus in September 2001. The remaining standing mines - 14 in Northwich and five in Carrickfergus - must therefore be considered as being at significant risk of future instability. Some of the mines are quite extensive with, for example, over 12ha of mined area lying at a depth of less than 100m below the town of Northwich. Detailed geological and numerical studies of all these mines have been undertaken to determine the magnitude of the hazard, particularly where there is overlying urban use. The studies have indicated that both creep mechanisms and especially solution processes have contributed to the development of instability; as these are ongoing processes the findings add weight to the expectation of further mine collapses. In both Carrickfergus and Northwich schemes are being put in place to stabilise the abandoned mines that constitute the greatest hazards.

Key words: United Kingdom, Rock Mechanics, Subsidence, Hazard

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