Follow-up on Bubbledeck floor investigation with DIANA **ir. K.W. Riemens (ABT)**

A Bubbledeck floor is a concrete floor structure that consists of a prefab bottom shell where plastic hollow spheres are placed on for weight reduction with in-situ concrete casted on top of it. Following the collapse of a parking garage at Eindhoven Airport in May 2017 where this type of floors has been applied, questions have arisen whether existing buildings with the same type of floors are sufficiently safe. The Dutch Ministry of Internal Affairs has subsequently published the information document: "Onderzoek constructieve veiligheid breedplaatvloeren in bestaande bouwwerken opgeleverd na 1999" ("Research structural safety precast concrete planks in existing buildings completed after 1999"). It has been established that several Bubbledeck floors in existing buildings in the Netherlands do not have the capacity to take up the occurring loads for which they have originally been designed. To gain insight into the structural behaviour of Bubbledeck floors and the risks they might impose, advanced non-linear calculations have been performed by ABT with the program DIANA using 2D and 3D models. It was shown that certain configurations of the floor system indeed lead to significant lower capacity than the originally calculated capacity. Strengthening measures have subsequently been sought, among these is the application of CFRP (Carbon Fibre Reinforced Polymer) strips. DIANA models were also made to check these strengthening measures with promising results. More recently, new experimental tests have been performed on specimens with CFRP strengthening measures, so that now also the DIANA models with CFRP strengthening measures can be checked and validated.