**The use of DIANA for non-linear finite element analysis in the advanced concrete structures course at Chalmers**

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In the international master's programme *Structural Engineering and Building Technology* at Chalmers University of Technology, theory and application of the finite element method (FEM) is an important part. In the Structural Engineering courses, a series of FEM projects are used to support the understanding of structural response, and to provide practice in modern design and analysis methods. In the final Concrete Structures course, Diana is used for non-linear analyses of reinforced concrete structures. The course is the fourth in a row of Structural engineering courses including FEM projects with a clear progression in the learning outcome. When the students start the Concrete Structures course, they have worked with the FE-programme Abaqus to model vibration in timber floors, to design concrete slabs based on linear analysis and to do non-linear analysis of buckling and yielding in steel beams.

The project is carried through by mixed student groups with four students, and consists of two parts. In the first part, the students use FX+ and Diana to model and analyse the response of a continuous beam modelled with beam elements. In the second part, each student group performs a group specification investigation with modelling of different phenomena. Examples of tasks are modelling of shrinkage, creep, temperature and prestress, influence of boundary conditions and modelling of slabs and D-zones. The project is supported by lectures on non-linear analysis of concrete structures. Our experience from using Diana for this FEM project is in general good. However, an even more user friendly pre- and post-processor, with a better integration to Diana would be desirable.