

## Making Reinforced Concrete Cross-sections Design Easy and Understandable

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Modern computing facilities provide an alternative graphical approach to the design of cross-sections. A description of this process might be "strength evaluation", since, for any chosen cross-section, concrete strength, and reinforcement size, location, and yield strength, the flexural resistance (capacity) is defined by the bending moment-axial force interaction diagram. The factored forces are then plotted into the diagram and, by comparing the capacity and demand on the computer screen, the designer can decide about the suitability of the chosen cross-section. If necessary, the cross-sectional properties can be changed easily.

There are several advantages of this design approach. The design procedure is fast, clear and economical. For example, all loading combinations for all the columns of the frame in Fig. 1 can be checked simultaneously. The procedure is the same for various shapes of cross-sections and it enables simple reinforcement optimization as well as the typization of cross-sections. For example, only two types of cross-sections can satisfy the design requirements for all the columns in the mentioned frame.

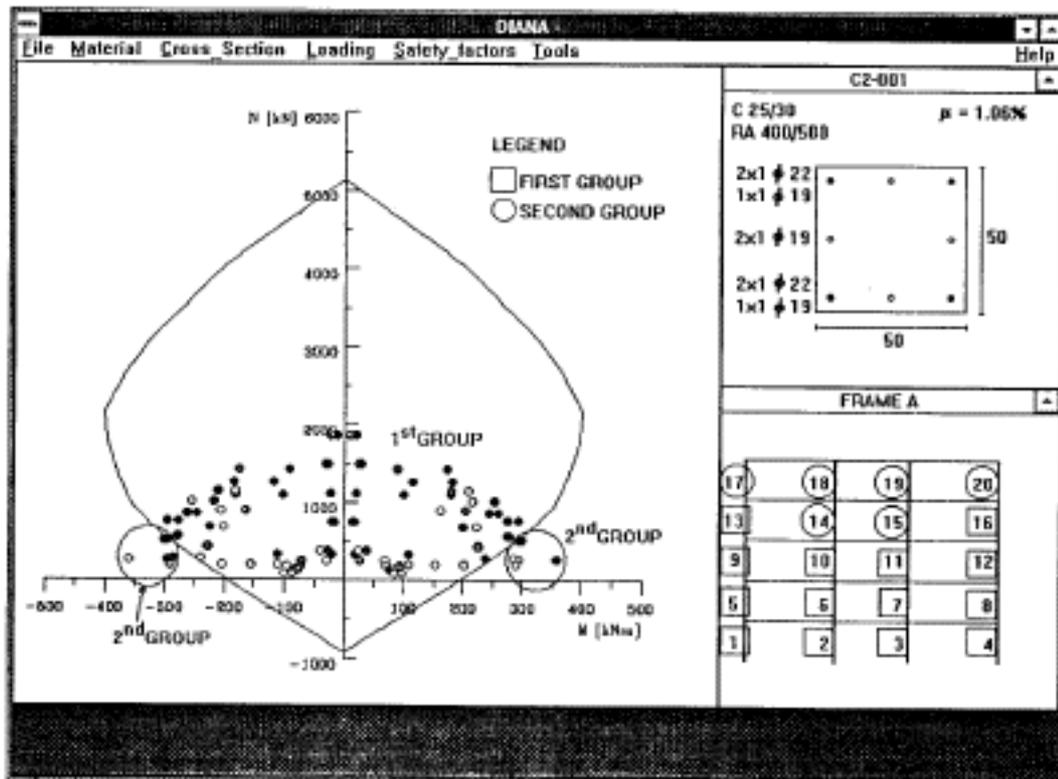


Fig 1: Design of flexural reinforcement in the columns of a RC frame

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It is particularly meaningful for less experienced engineers and students that the effects of various parameters on cross-section capacity are clearly displayed (Fig 2). This design approach has been applied to a prototype of an interactive program system for the analysis and design of a frame-wall reinforced concrete building.

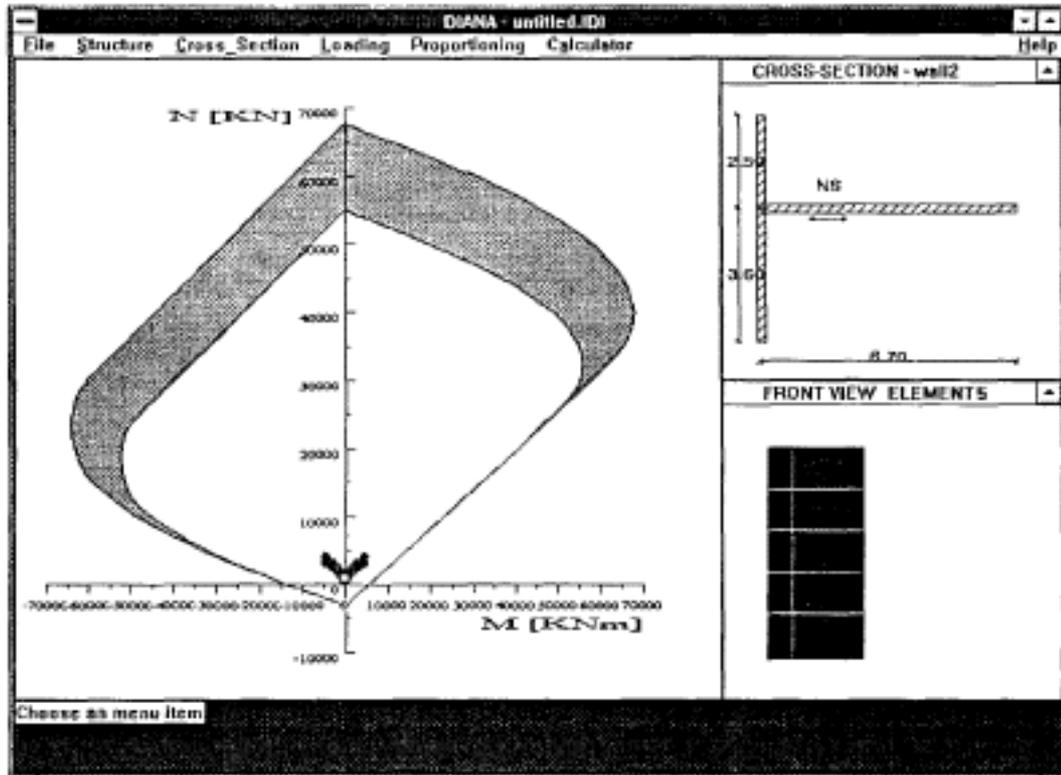


Fig 2: The effect of different concrete quality on cross-section capacity

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