Event-Driven Structural Analysis Software

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The process of engineering design requires engineering analysis, which is of varying levels of complexity depending on the engineering challenge. In the modern era, engineering analysis has generally become embodied in software packages. Within these software packages, the model development process input methods often use textboxes, tables and buttons which are restrictive, tedious and give the user no real sense of response or feedback. Furthermore, should the user wish to make even the slightest alteration to the model, the analysis process must often be repeated in its entirety. Why must such a simple action as changing one parameter require re-declaration of intent?

The aim of this project has been to develop a tool for structural analysis that provides that utilises a straightforward interface and that produces results “realtime” as the user interacts dynamically with it. The user can build structures (continuous beams) and add loads using quick, intuitive mouse actions. Once the program deems the structure to be static, it is automatically analysed using the stiffness method and the results are displayed. Subsequently, as changes are made to the structure or loading the analysis is performed immediately and the results are displayed. This gives the user a real sense of interaction with a tool that responds instantaneously to his/her input, meaning the user spends less time modelling the problem and more time applying the solution to the challenge in question.

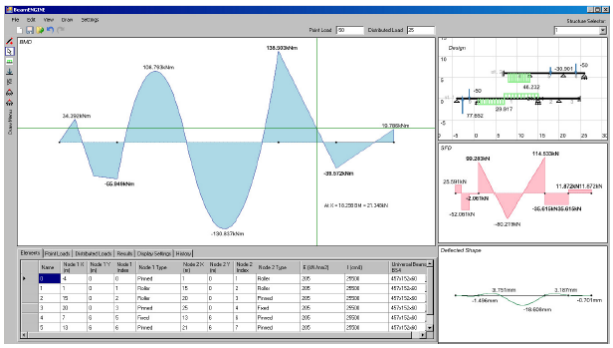

Figure 1. Examining the Results

Part of the point of developing this style of software is that it allows the user greater scope to develop an intuitive understanding of structural behaviour. In real life, as children (and as scientists/engineers prior to the computing era), understanding was developed through physical experimentation. In some areas, modelling has usurped this process. By providing such instantaneous feedback we are mimicking more closely both the real world and the natural process by which we learn, and can instill some of the finer concepts of how a structure responds to loading.

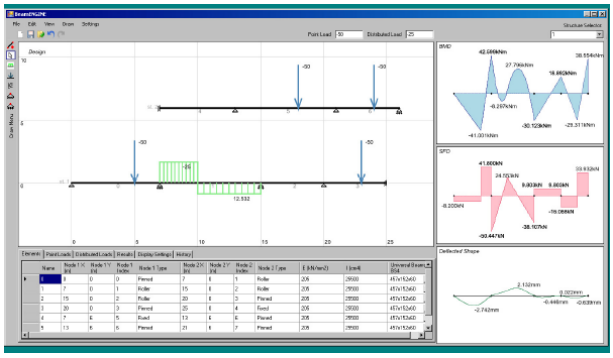

Figure 2. User Interface

Further research is being implemented to develop the software to commercial standard as this project is still very much in its youth. The next step is to expand the scope of the software to encompass all of the functionality required of a practical structural analysis tool. The result will be an extremely powerful software that could revolutionise structural analysis in industry and provide and revolutionary interface for the classroom.