1. Introduction to the Developed Software

A computer software is developed in Visual Studio (version 2010) [62] using Vb.net programming language to perform the analysis, design and cost optimization of prestressed U-shaped girder. The general tab, dimension tab and initial design tab of developed software is shown in **Figure S1** through **Figure S4** respectively and can be found in the appendix section. In the general tab and dimension tab there are text boxes for material properties, initial design variables and for explicit constraints limits. In the initial design tab, analysis and design checks are performed for initial design in order to start optimization process efficiently. Also the optimum results after successful iteration in a program is shown in **Figure S5**.

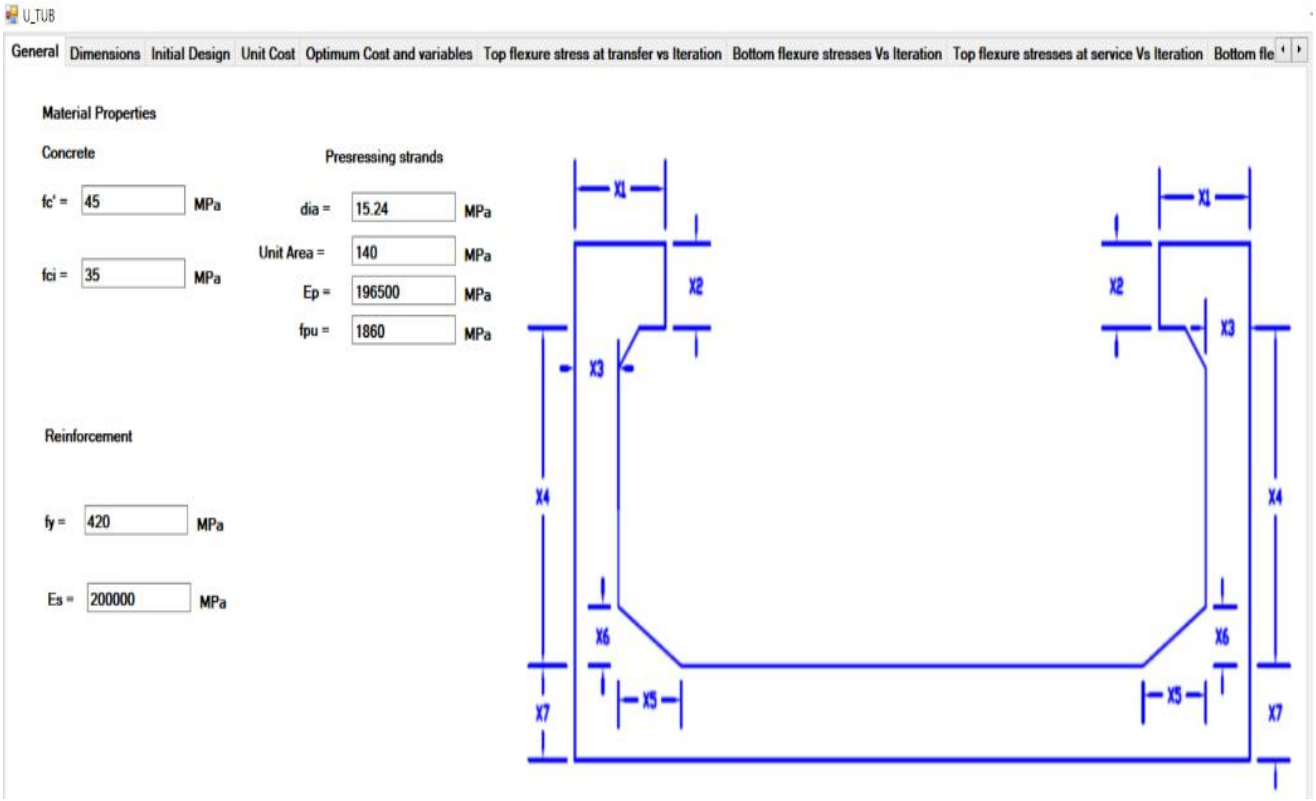

Figure S1. General view of developed software.

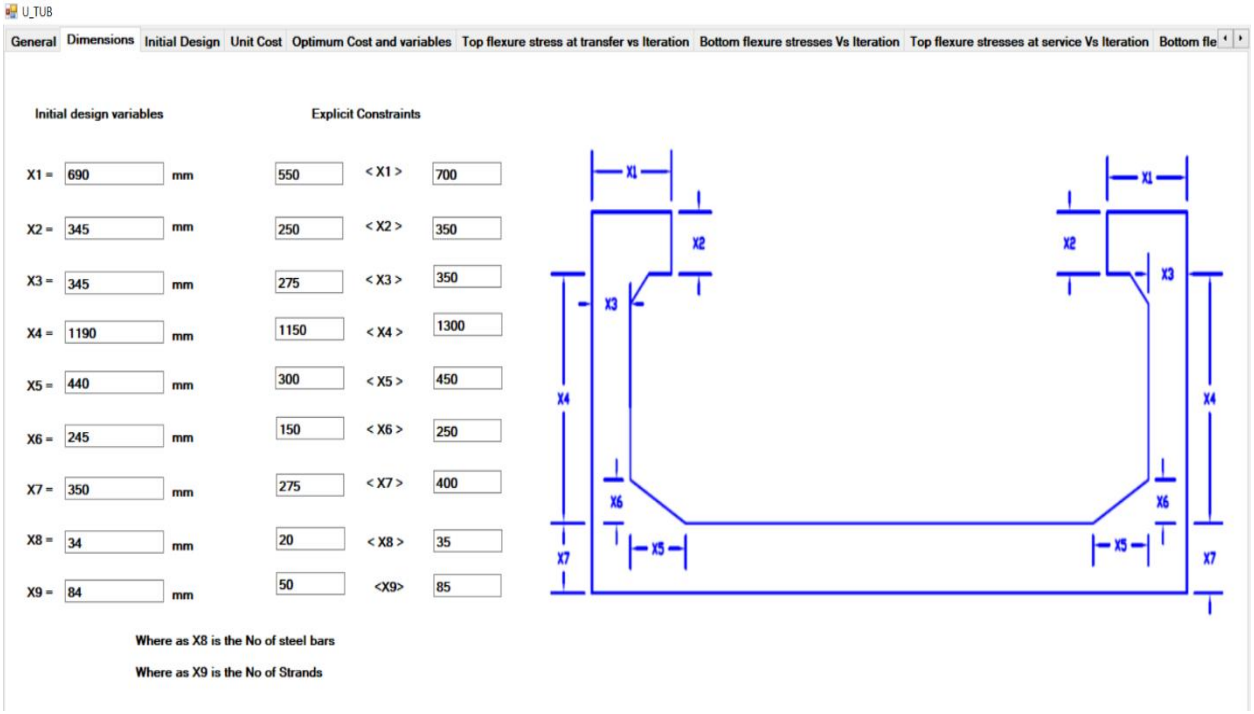

Figure S2. Tab for Initial design variables and explicit constraints.

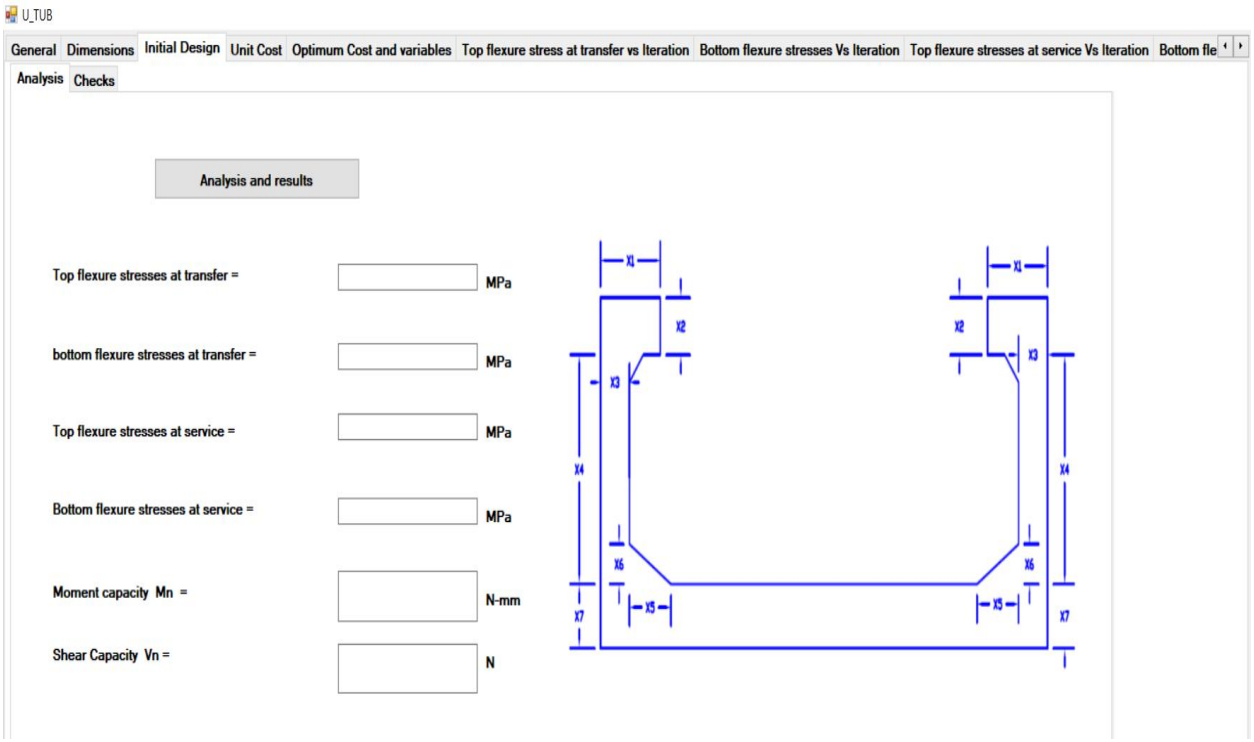

Figure S3. Button for initial design analysis and results.

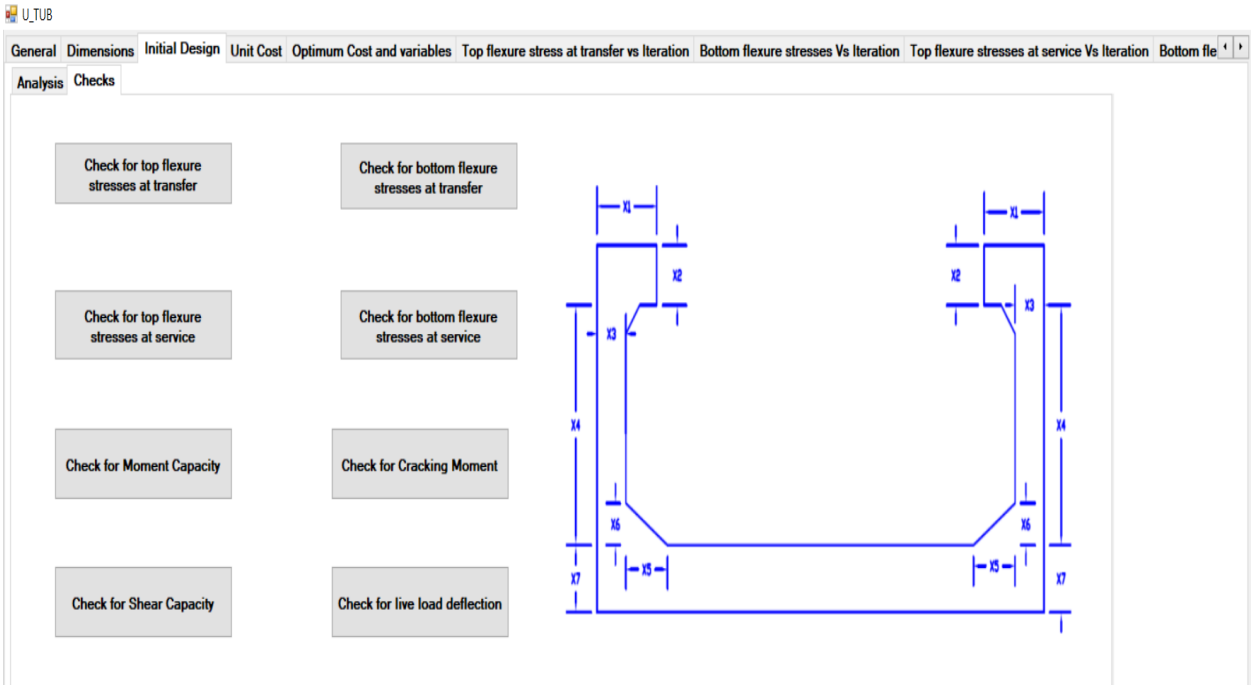

Figure S4. Different buttons for initial design checks.

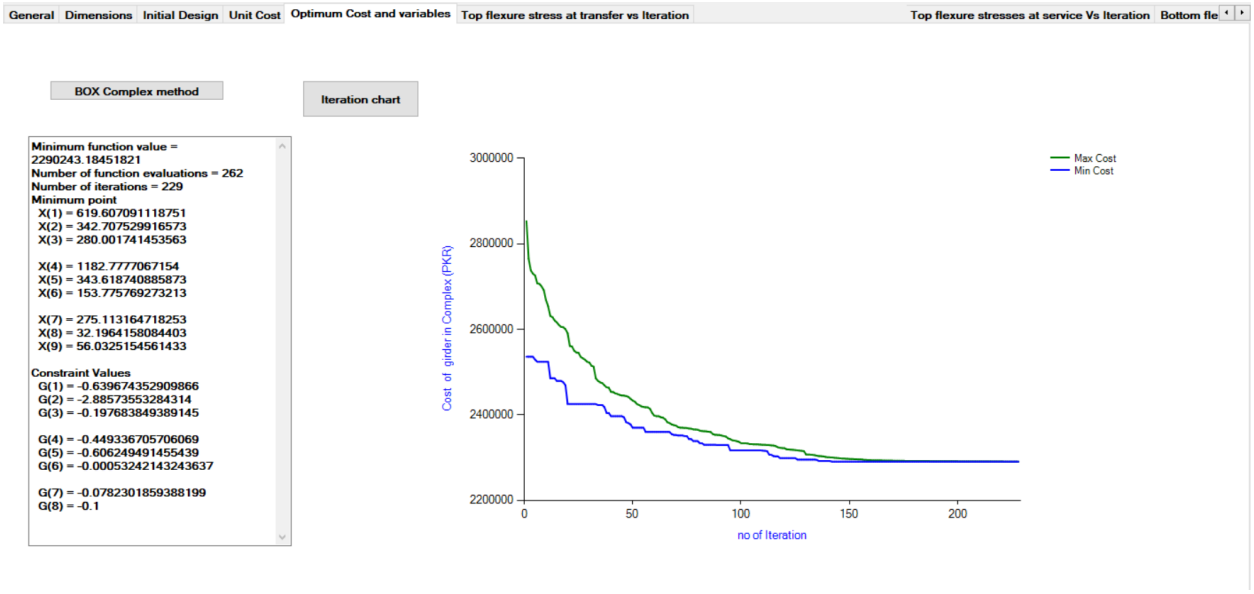

Figure S5. Optimum design result in the developed Software.