CAD MODELING COMPLEX STRUCTURES FOR FEA ANALYSIS

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Abstract: In this paperwork is presented a step-by-step method for modeling complex structures, such as frames for mechanical presses, with the aid of powerful CAD software, like Pro/Engineer, in order to perform consequent static or dynamic analysis based on finite element method, using a top FEA program like COSMOS/M.

The modeling method is presented on a numeric example, represented by the bed of a crank mechanical press type PMCR-63, mechanical press with open bed, with nominal force 630 kN, presented in *fig.1*.

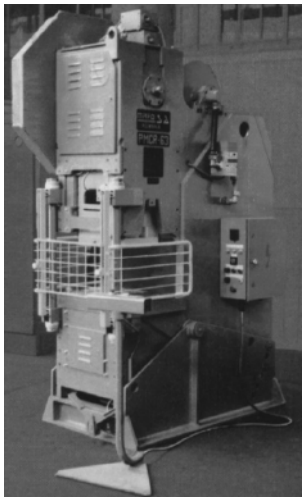

Fig.1. PMCR – 63 press

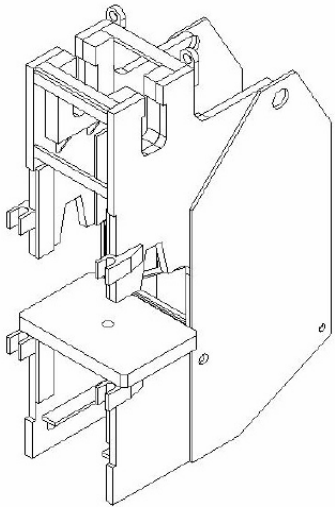

Fig. 2. Geometric model of the press bed

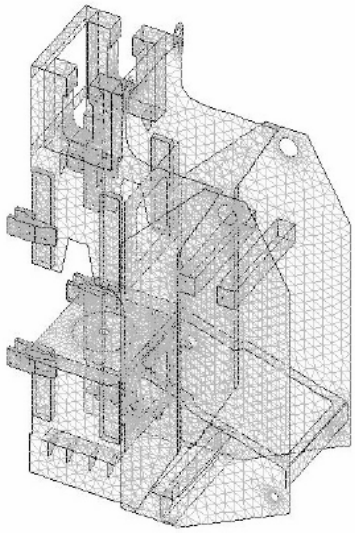

Fig.3. Refined mesh

By analyzing the geometry of structure it comes to conclusion that can be discretized in majority with plate type finite elements. The bedplates have been discretized by SHELL elements with 3 nodes, the thickness of a plate being constant. For the reason of real convey of forces, the cantilevers and the bosses from the upper side have been discretized by SOLID elements.

For solving a problem of structural analysis and optimization of a complex structure like a mechanical press bed must be followed certain phases:

a- completing geometric model; b- establishing the analysis type; c- defining finite elements type; d- defining the mesh; e- defining material characteristics; f- defining geometric characteristics.

The follow of these stages may guarantee the precision of the model and enhance the trust grade of results.

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