Modelling a screw press behavior: Comparison between Experiments, FE Simulation and a Purely Elastic Model

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Abstract. The increasing use of nickel and cobalt superalloys in the industry brings new issues to forging manufacturers concerning Finite Element analysis of the forming process. Simulations and experimentations show good agreement for traditionally used materials like steel. But once we consider high performing materials, significant differences can occur between numerical and experimental results. This study focuses on the machine behavior in the case of a screw press LASCO SPR400. Starting from an approximation of the press geometries, a purely elastic model (PEM) has been developed and numerical simulations have been performed for the press's uprights as well as the whole press. Predictions from the PEM and the FE simulation have been compared with experiments where the uprights stiffness and the press stiffness were both determined with several types of strokes. Results show that the PEM is not sufficient to correctly model the press behavior because of the impact of the mechanical connections between the elements of the press.
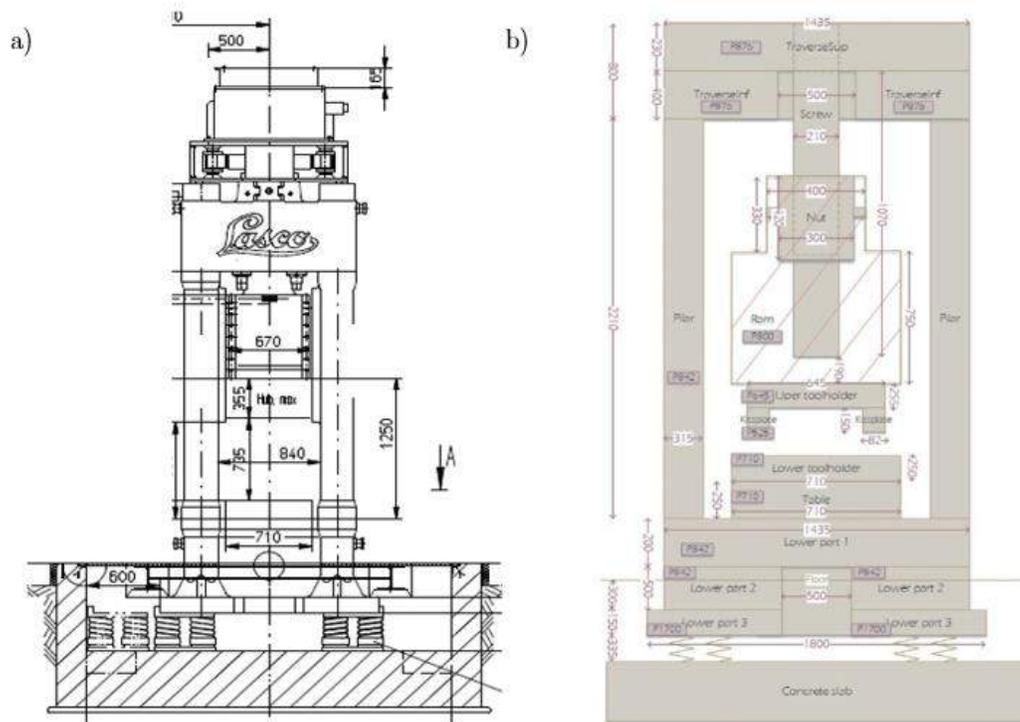
Figure 1 a) Face view of the screw press LASCO SPR400 b) Screw press blueprint with geometrical approximations
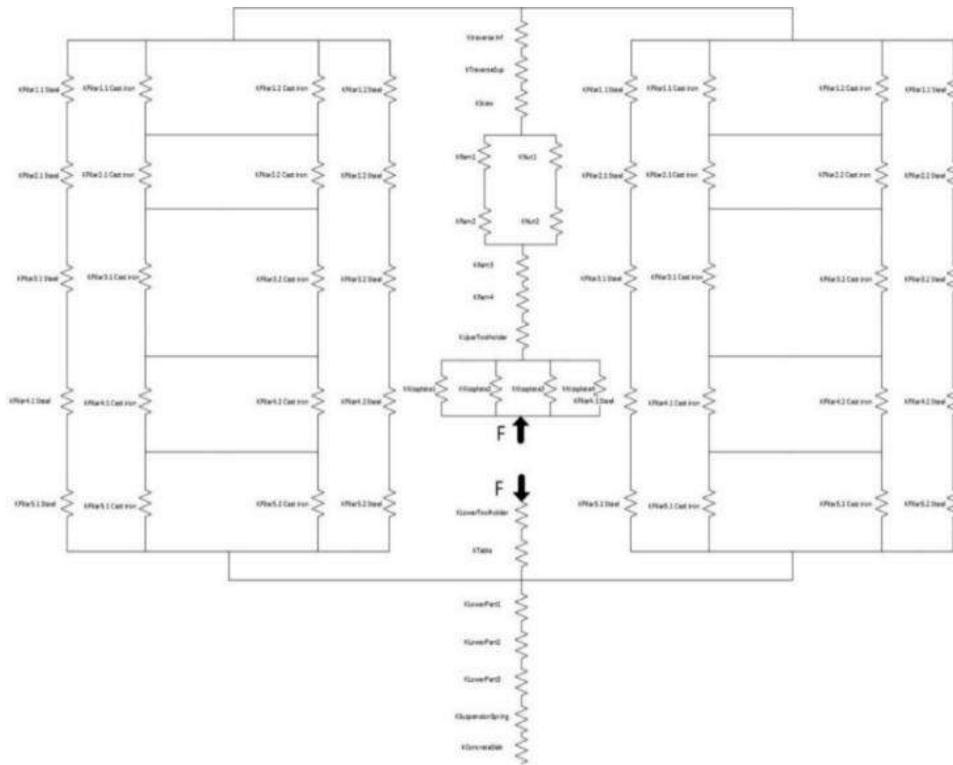
Figure 2 PEM with spring associations in serial and parallel for the LASCO SPR400
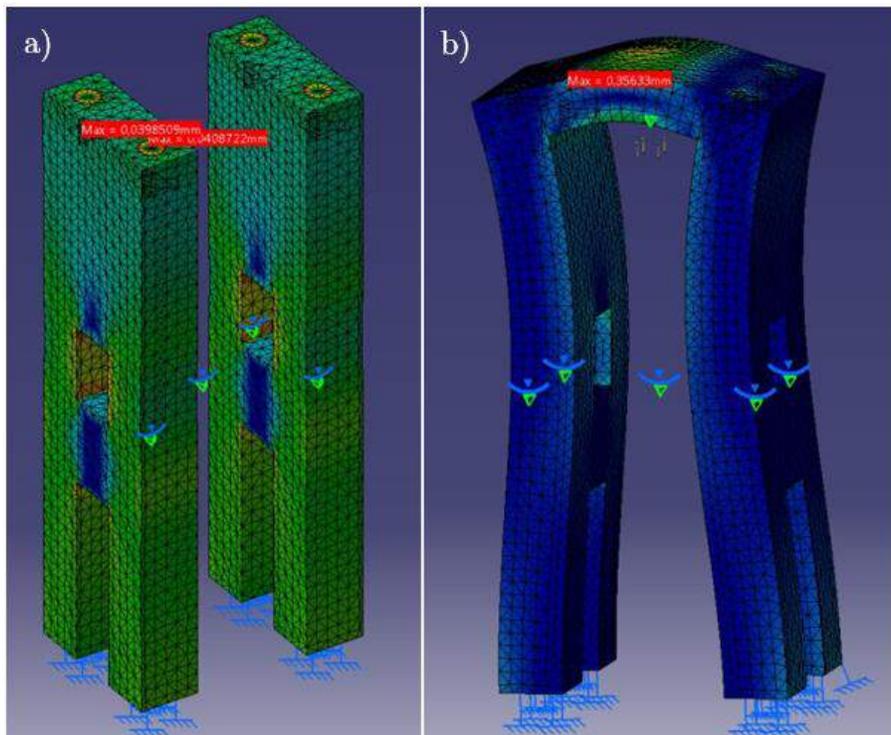
Figure 3 Results of FEM simulations a) for the LASCO SPR400's uprights b) for the LASCO SPR400 approximated with a portal system