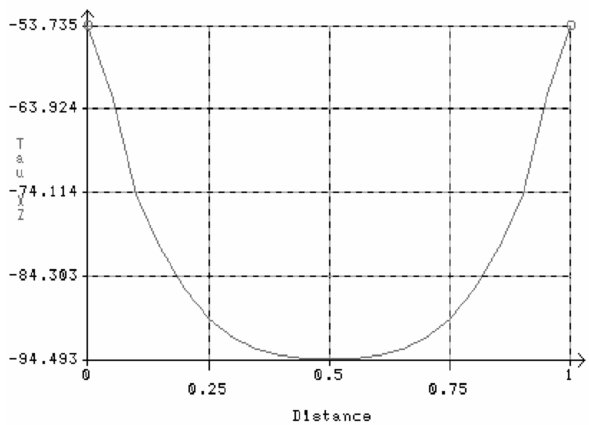

Fig. 15 Stresses τ_{xz} at the top of the third layer across the section I-J [MPa]

In the first example, there is solved unsymmetric laminated composite plate under in-plane loads. We can see, that there is coupling ($\mathbf{B} \neq \mathbf{0}$) between in-plane and bending deformations of the laminate structure (Figs. 3-8).

In the second example, there is solved symmetric laminated composite plate under bending loads. We can see, that there is not coupling ($\mathbf{B}=\mathbf{0}$) between in-plane and bending deformations of the laminate structure (Figs. 10-15). Transversal shear stresses τ_{yz} in both, symmetric and unsymmetric laminates are negligibly instead of free edge regions (Figs. 7, 13), that are critical in design process.

IV. CONCLUSION

The numerical approach of modelling of laminated composite plates was investigated in this paper. Within the numerical approach of modelling, there was described the shear deformation theory of first order for laminates. For this approach of modeling, there was solved the unsymmetric and symmetric laminated composite plate. In the first numerical example, there is solved unsymmetric laminated composite plate under in-plane loads. We saw that there is coupling effect between in-plane and bending deformations of the laminate structure. In the second example, there is solved symmetric laminated composite plate under bending loads. We saw that there is not coupling effect between in-plane and bending deformations of the laminate structure. The symmetric laminates are designed for flat structural elements and unsymmetric laminates for curved structural elements.

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