for 10 min, and finally cooled back to room temperature.

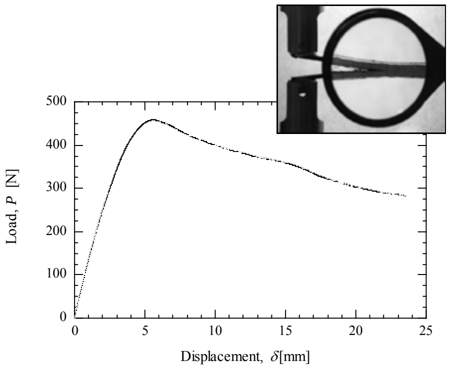

Fig.2 Load–displacement curve in unidirectional commingled CF/PA12 laminates.

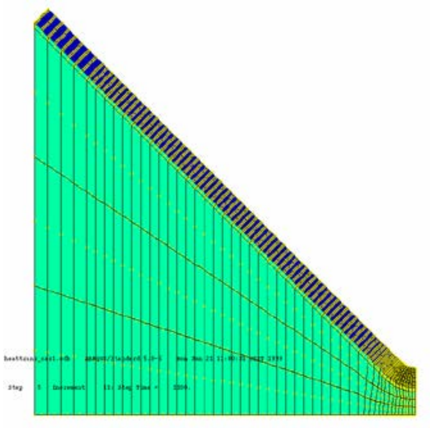

Fig.3 Geometry of the mould used for the manufacture of U-shaped composite laminates FEM model

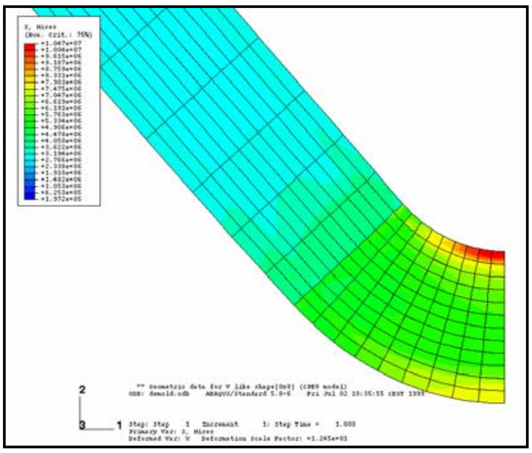

Fig.4 Von-Mises stresses of [90_8], geometry of half a section of a U-shaped laminate after demoulding

4 Conclusion

The build-up of stresses during the cooling of the material was calculated and curvatures on demoulding were predicted by numerical analysis. Precise control of the cooling applied during the solidification stage of the composite processing cycle is of the utmost importance in controlling the manufacturing cost, the matrix morphology, the mechanical performance and the dimensional stability of the final part. Increasing the solidification rate has the effect of reducing the processing cycle time and thus the manufacturing cost.

Thermal gradients within the composite during solidification, due to rapid cooling or unbalanced cooling conditions or complex geometry of the mould, induce internal stresses which may affect the dimensional stability of the part by causing post-processing distortions. The predictive and experimental analyses were conducted on laminated channels of different stacking sequences, which were processed with solidification rates around 10°C/min in the crystallisation temperature range.
The effect of springforward with the viscoelastic model has been investigate the influences of the steel demoulding and the effect of difference in thermal expansion between the mould and the composite component in U-shaped PA12/CF laminates.
Good correlation was obtained between the numerical prediction and the experimental data for the stress profiles and the warpage.

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