



Effect of Viscosity Development in the Infusion Process of Composites

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LIQUID MOULDING PROCESSES







LIQUID MOULDING APPLICATIONS

VIM









Wind Turbine Blade, Vacuum infusion



RIFT

Mandrel



Mould







RIFT













VISCOSITY OF EPOXY



VISCOSITY OF EPOXY—IMPREGNATION



VISCOSITY OF EPOXY— IMPREGNATION







VISCOSITY OF EPOXY



CHALLENGES AHEAD

SGRE: SG 14-236 DD 115 meter blade length 236 m rotor diameter

GE: Haliade-X 14.7 MW-220 107 meter blade length 220 m rotor diameter





93 meters





CHALLENGES AHEAD

Dry spots in wind turbine blades can be as long as 1m!

Maintenance is done after the infusion process

This maintenance can take the same time as the infusion itself!



Dry spots in wind turbine blades





EXPERIMENTAL SETUP

4 layers of plain weave GF4 inlets ports, single inletfrom the main epoxy potPeel ply on topSealant tape and vacuum bagApplication of vacuum







EXPERIMENTAL SETUP







EXPERIMENTAL SETUP

Filling of the mould , Experimental data









NUMERICAL SIMULATION



- 2D shell model

NUMERICAL SIMULATION







VALIDATION













VALIDATION







CONCLUSION

- A non-linear viscosity development of resin studied
- Infusion process was performed in a prototype mould
- A numerical simulation was conducted for the same mould
- Very good agreement was found between the non-linear simulations and the experimental infusion.



THANKS FOR YOUR ATTENTION





