Delamination initiated by a defect

Composite materials in wind turbines are mainly joined with adhesives. Adhesive joining is preferable since it distributes the stresses over a larger area. This study shows how a defect can influence the fracture behaviour of adhesively joined composite. Repeated experiments are performed using double cantilever beam specimens loaded with bending moments. The specimens consist of two 8 mm thick GFRP-laminates which are joined by a 3 mm thick epoxy adhesive. A thin foil close to one of the laminates is used to start the crack. For some of the specimens a defect is created by an initial load-unload operation. During this operation, a clamp is used in order to prevent crack propagation in the main direction. For the specimens without defect, the crack propagates in the middle of the adhesive layer. For the specimens with defect, the crack directly deviates into the laminate. After about 25 mm propagation in the laminate, the crack returns to the adhesive. Compared to the adhesive the fracture energy for the laminate is significantly higher.