Motivation

As a part of the Smart Blades project a bending-torsion coupled rotor blade with asymmetrical lay-up will be designed. From the manufacturing point of view the challenge is to position the fibers in the exact fiber angle. The chosen manufacturing concept provides a precise angle fixation of the fiber layers with binder materials. In addition to that the transport of the preforms to the main mold must be examined. As third topic the fibers should be placed flat and preformed as whole stacking. Therefore the mold needs to be formable like shown in Figure 2. Figure 3 shows a concept of a variable tooling concept.

Functioning of the tooling

Molds for rotor blades are usually made of glass fiber reinforced plastics. They have the advantage to be similar in thermal expansion as the rotor blade components. The high flexibility provided by the glass fibers is required to realize a morphing structure with this dimensions.

Transportation of Preforms

For removing the preform it has to be stabilized. Based on technology analysis a transportation system for a vacuum compacted stacking will be established. The stabilized preform will be transported by robot platforms (figure 5).