

## Master's Thesis project *Modelling reinforced polymers*

The search for functional, light, tough and tailored composites is a high priority within the sports and leisure industries. One way to achieve this is by using different reinforcements in collaboration with the more traditional polymer materials. Several different composite technologies has therefore been developed which can be adapted to fit several kinds of products that need to be reinforced – from flexible fabrics to more robust plastic details. They are excellent alternatives to either thermoset composites, or traditional polymeric parts.

Inxide has developed a new type of technology, X-TECH, that can be used to achieve the goals stated above for the sport and leisure industries. A tailored pre-form with continuous fibres is designed and produced and is laid out using a fully automatic robot cell. The shape of the pre-form is derived from the defined loads on the structure. Multiple rounds of continuous fibers are then laid out to create an endless reinforcement. The pre-form is then over-moulded with the traditional injection process, thus considerably minimizing the infrastructural costs of the technology.

The work of the thesis consists of modeling and simulations investigating the properties of a sports article that is reinforced using X-TECH. Specifically, the aim will be to determine how the technology effects the characteristics of the application and how this can be modeled in an effective way. Also, characterization of the sports article performance based on different load cases need to be addressed.

The master thesis project is intended for 2 people and is a collaboration between FS Dynamics and Inxide. The people performing the project will be situated at FS Dynamics office in Göteborg and will also have a lot of contact with Inxide.



**FS Dynamics** is a focused and independent consultancy company providing highly skilled competence within fluid and structural dynamic analysis.

**Inxide** is a full service supplier of advanced composite solutions for high volume applications within the automotive, sports and leisure industries.

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