Plan Overview

A Data Management Plan created using DeiC DMP

Title: Manufacturing and mechanical properties of fibrehybrid composites with controlled microstructure: Assessment of synergetic effects by micromechanical modelling

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Template: DTU data management plan

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Project abstract:

The need to enhance the performance characteristics of a material system and to reduce the associated greenhouse gas emissions has motivated various industries, particularly wind energy, aerospace and automotive, to look for novel lightweight engineering materials. The “Hybrid Composites” can prove to be a stepping stone in that direction. Combining the fibres in a hybrid composite means a possibility of creating a lighter and stronger material and reducing the cost of the material.

The HyFiSyn project is a Marie Curie project funded by the Horizon 2020 Research and Innovation programme of the EU. This PhD project aims to explore the correlation between the microstructure of hybrid composites and its performance characteristics. The project is divided into two parts – a modelling part, and an experimental part. The modelling part will focus on the development of micromechanical models and finite element models to predict optimal microstructures for wanted composite performance characteristics, e.g. static and fatigue mechanical properties. The project will explore the required microstructure which might lead to synergetic effects in hybrid composites. The experimental part involves the manufacturing of hybrid composites with desired microstructure and volumetric composition. Different materials systems and manufacturing techniques will be used. Image based microstructural analysis and materials characterization will be performed to study the synergies in hybrid composites. Industrial scale recommendations for the selection of fibre types, microstructure and manufacturing techniques will be identified for tailor-made mechanical performance of hybrid composites.

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Manufacturing and mechanical properties of fibrehybrid composites with controlled microstructure: Assessment of synergetic effects by micromechanical modelling

Data Collection

Describe the data that will be collected.

This PhD project is divided into two parts – a modelling part, and an experimental part.

Experimental Data

Experimental part consists of mechanical testing of the specimens. The mechanical characterization will involve both static and fatigue tests. The experimental data will be collected in test lab at composite materials section by technicians. The universal testing machines will employed and strain gauges or extensiometers will be used to measure the required parameters, the initial processing of the data done by instrument´s software. The data can be futher processed using matlab according to the required need. The data is stored in common formats (.txt, .xlxs, .docx, etc). The photographs will be taken before, during and after the testing, and will be stored in common formats (.jpg, .tif, .png etc.). The data volume is expected to be in gigabytes.

Modelling Data

The simulation of the specimen will perform to validate the experimental data. Finite element analysis tool Abaqus will be used. The results will be stored in digital format. The data volume is expected to be in gigabytes.

Describe any restrictions to the data.

The use of data from HyFiSyn will comply with the agreements stipulated among all the project partners and the commission.
Data such as models, code, generated during the Ph.D. will comply with the intellectual property rules established for Ph.D. students at DTU.

Data Storage

Describe the IT infrastructure to be used.

All the data used during the current project will be grouped and stored in the designated
folders in the COM folder (Q-drive). This drive is protected and have a
regular back up schedule.All Wind Energy employees have access to the Q-drive. The security of these drivers is protected by DTU.

Documentation

Describe the metadata to be associated with the data.

All the relevant metadata such as technical specifications, equipment, methods, data sources, experimental set-up etc. will be stored.

Describe the types of documentation that will accompany the data.

The data is usually documented by the technician or the user. It will usually stored in a text file and contains all the relevant information reagrding the experiment including the name of the technician, date, experimental set up etc.

Data Sharing

Describe which data will be shared.

The scientific finding of the project will be disseminated using scientific conferences, journal articles and book chapters. The publication has been made open access after some required period.

Describe how the data will be shared for possible reuse.

Data is to be shared once it has been properly labeled, organized and verified.

Long-term Preservation

Describe how data will be archived beyond the scope of the research project.

The data is being stored in a structured way in Q drive to make it easy to access and understand for other users