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Title: Sub-modeling approach of plastically deformed geometries of Nb3Sn cables and strands for the 11T dipole magnet.

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The presentation will aim to cover the steps that were followed for a first attempt at using a sub-modelling approach to analyse at multiple scales the stress-strain behaviour of the 11T Nb_3Sn dipole at CERN. These steps can be summarised as the following:

- Characterisation of the individual materials within the impregnated coil block through an experimental campaign using 10-stacks and other equivalent geometries.
- Calibration and validation of material models with experimental data using simple geometries.
- The validated material properties were used with more complex loading conditions and within realistically deformed assemblies and geometries such as deformed cable strands and coil sections.
- The realistic geometries of strands, cables and coils are rendered using optical and scanning electron microscopy images. These are meshed using the post-processing image analysis software ScanIP and analysed in Ansys using the validated material models.

The aim of the work was to produce a workflow for a more detailed analysis of the global and local stresses and strains observed in 11T Nb_3Sn dipole coils at various stages of assembly and operational conditions. This detailed analysis contributes to understanding the stresses and strains seen at filaments within much larger coil assemblies and to assess these in the future against experimental data obtained during recent Ic degradation studies at CERN.