

Summary Slide_IAEA-FIP/P8-15

- The numerical models are powerful tools towards selection, verification and optimization of various process parameters during manufacturing of long length Cable in conduit conductor (CICC) considering manufacturing process, equipment's, materials used in CICC, desired performance from CICC, preventive majors and innovative solution to improve designs.
- In this paper, It is observed that that lower contact angle (longer twist pitch during cabling) between two strands produce less strand damage for both cases (Nb_3Sn - Nb_3Sn and Copper- Nb_3Sn). The deformation of the Nb_3Sn strand in Copper - Nb_3Sn pair is less compare to the Nb_3Sn - Nb_3Sn pair, which in turn reduces contact stresses during cabling operation.
- The numerical investigations to study the distribution of radial stresses on jacket tube for various feeding velocities during manufacturing of CICC (compaction and swaging) are carried by mimicking actual jacketing operation. It is observed that initial tube size, compaction ratio, die design and material properties are the critical factor affecting radial stresses generated on jacket tube during manufacturing of CICC.
- These numerical models can be further improved by the utilization of large material databases, microscopic modeling of superconducting strands, verification of all factors during manufacturing of CICC such as rotary as well as linear feed, die design and its rotary moment, frictional forces etc. as well as mechanics of superconducting cable during swaging of jacket tube.
- The effect of manufacturing processes estimated on the performance of superconducting can be verified with experimental validations to benchmark it, enabling its wider use.