

## ON THE PRE-TENSIONING TECHNIQUE OF PMC-TUBES FOR AN ULTRA-LIGHT WHEEL CHAIR WITH MEDICAL APPLICATIONS

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**Abstract:** The paper presents an original method to increase the loading capability of PMC (polymer matrix composite) tubes used for ultralight wheel chair for persons with locomotors disabilities. The method involves the introduction of supplementary internal stresses in thin-walls cylinders with only a few wound layers. An original device has been developed to attain this end. Various tube specimens with different disposal of reinforced material were carried out. The specimens have been heated at a proper temperature and then an elastic material was pressed at the inner of the tubes. While keeping the internal pressure, the specimens were cooled and then discharged. Then, the pre-tensioned specimens were subjected to internal pressure until weeping occurs. Using this method of pre-tension, the loading capability of PMC-tubes is increased up to 43%. A theoretical approach regarding the cross-ply and balanced angle-ply composite tubes is presented.

**Key words:** Pre-tensioning, Internal stresses, loading capability, PMC-tubes, Weeping pressure, Cross-ply composite, balanced angle-ply composite.