Mechanical devices for prestressing FRP (sheets and rods) and their applications in structural strengthening

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Objectives:
1. Develop anchor systems and devices to post-tension GFRP bars and FRP sheet.
2. Study the behavior of unreinforced masonry walls strengthened by prestressed GFRP bars under a diagonal force.
3. Study the flexural behavior of RC beams strengthened with prestressed FRP sheet.

Background:
1. Property of thermoplastic resin allows FRP bars can be softened when heated.
2. FRP sheet could not be stretched directly. It needs to be impregnated with resin before application. Resin helps to transfer tension between fibers and protect them from impact.

Conclusions:
1. The hand-held device for GFRP bars is effective and more than 85% of initial force was kept after relaxation.
2. The device is capable to apply and keep tensile force to FRP sheet.
3. Shear capacity of walls and flexural strength of beams increased after strengthening.