

Abstract Submitted  
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**An Engineer's Physics Lab – using a Large Force Frame** CHRISTY HEID, DONALD RAMPOLLA, Chatham University — We have constructed very economical, easy to assemble force frames that are used by students in our general physics laboratory at Chatham University. The force frame is used at the beginning of the semester to study vector properties of forces. The force frame can be used as a horizontal or vertical force table. Angles of forces are measured using a large movable (rotation and translation) Cartesian coordinate board attached to the frame with large binder clips. The force frame is a versatile device which is used for a number of other experiments, including beam bending and torsion, mechanical resonance, projectile trajectories, torque, mechanical equilibrium, an isolated non-magnetic support for magnetic field experiments, easily adjustable support for inclined plane experiments, support for traveling wave experiments with heavy rope, and support for large scale fluid flow experiments. One advantage to a wood frame is that things can be easily stapled, nailed, screwed or glued just about anywhere on the frame, and damaged frame members can be replaced easily. As one of the few remaining women's undergraduate institutions, we have found the use of these frames to provide an additional advantage in helping women overcome their fear of simple power tools and assembly of mechanical parts as they become comfortable with these through working with the force frames throughout the semester. We intend to describe and model these applications during the session.

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