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## **Reinforcing qualities of PVC stay-in-place formwork in concrete design**

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The goal of this research is to amend current ACI code parameters for the case of blast resistant design. The specific amends being investigated concern the structural qualities of stay-in-place formwork. Under current ACI designations the presence of stay-in-place formwork is to be completely neglected with regards to the flexural strength of reinforced concrete walls. This section of code, however, does not take into account stay-in-place forms made of materials with substantial tensile strengths, such as PVC. Advantages of PVC are its significant increase in strength as the rate of strain is increased, its ability to absorb significant amounts of energy during deflection, and its ability to capture fragments of shattered concrete during blast situations. The experimental strategy is to pour two sets of reinforced concrete walls, one utilizing PVC stay-in-place forms and the other standard reinforced concrete wall sections. The flexural loading will then be applied by laying each wall specimen horizontally with roller connections at large bulkheads on both ends of the specimen. A distributed pressure load will then be simulated by a branched load distribution system. Using actuators to measure the deflection of the sample in a number of places, information will be gained relating to the strain of the sample, which can be combined with loading data from the hydraulic cylinder powering the load distribution system to plot an experimental pressure verses deflection curve. This plot will define the amount of energy that the specimen is able to absorb, which is the primary requirement for effective blast resistant materials. From these results an empirical equation will be written to predict the response of these stay-in-place form systems and give engineers more information from which to make design judgments.