Flexural behavior of ferrocement sandwich panels.

Mohammed Saleem

Civil Engineering

June 1988

Abstract

Ferrocement is a thin section cement mortar with the reinforcement in the form of multiple layers of light mesh, where strength and rigidity are developed through form and shape. Thin slab elements cannot withstand heavier loads and do not satisfy serviceability requirement of limiting deflections. Sandwich panels can overcome these limitations due to increased depth and rigidity, also there are many other advantages such as increased heat and sound insulation and efficient energy absorption and dissipation.

This thesis presents a study on ferrocement sandwich panel in flexure. Experimental program consisted of casting twelve full size (1200 mm x 2400 mm) panels. These panels are used to study the effect of parameters such as the number of wire mesh layers and skeletal steel in panel plates, web reinforcement and the number of ribs. All the panels are tested in flexure under two point loading applied at third points. Various aspects studied are cracking loads and ultimate loads, deflections and curvatures at cracking, yielding and ultimate stages, stiffness and rigidity during eleastic uncracked, cracked and ultimate stages.

Tests have shown that load-deflection and moment-curvature curves can be idealized into three stages, such as elastic uncracked, cracked and plastic. Ultimate moment capacity is found to be directly proportional to the number of wire mesh layers. Skeletal steel increases the moment capacity. Cracking stress depends on mortar strength and volume fraction of wire mesh. Web reinforcement enhances the shear capacity. Shear capacity is also found to increase with increased number of ribs.

Theoretical procedure for assessing the first crack stress, ultimate moment and deflection is presented. It is shown that the proposed methods agree reasonably with the experimental results.