Assignment 1 (CE 414)

Q1: A 15 x 36 inch prestressed concrete beam is loaded by a uniform load of 3.65 k/ft on 25 ft long span. The prestressing tendon is located at 8 in above the bottom fibre and produces an effective prestress of 400 kip. Compute the fibre stresses in the concrete at the mid-span section by the concept of transforming concrete into an elastic material.

Q2: Compute the fibre stresses in the concrete at the mid-span section by the concept of load balancing for a 5.5 m long prestressed concrete beam with 50 x 110 cm cross sectional dimension. The beam is loaded by a uniform load of 45 kN/m. The prestressing tendon is located at 90 cm below from the top fibre and produces an effective prestressing force of 1500 kN.

Q3: A 30 ft long and 20 x 40 inch prestressed concrete beam is loaded by a uniform load of 4.50 k/ft. The prestressing tendon is located at 7 in below from the c.g.c. and produces an effective prestress of 500 psi. Compute the fibre stresses in the concrete at the mid-span section by the concept of internal resisting couple.

Q4: A prestressed concrete member beam 600 mm x 1200 mm has a simple span of 8 m. The beam is loaded by a uniform load of 50 kN/m including its own weight. The prestressing tendon is located at 250 mm above the bottom surface and produces an effective prestress of 1700 kN. Compute the fibre stresses in the concrete at the mid-span section by the concept of transforming concrete into an elastic material.
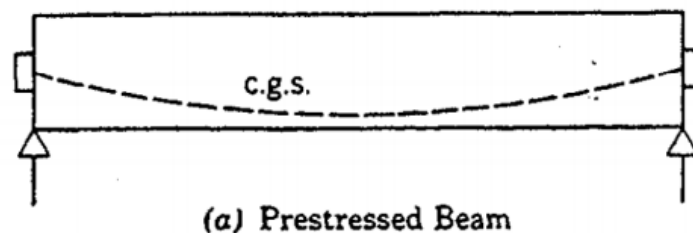

(a) Prestressed Beam

Fig: Shape of the tendon for all questions