

- 3 A cantilever spar cable-stayed bridge is a unique yet functional variation of the traditional cable suspension bridge.

In one such model bridge, a bridge beam is supported by a cable. The cable connected at an angle of 30° to a non-uniform cantilever spar of length L slanted at an angle of 50° from the ground with a base at P, as shown in Fig. 3.1.

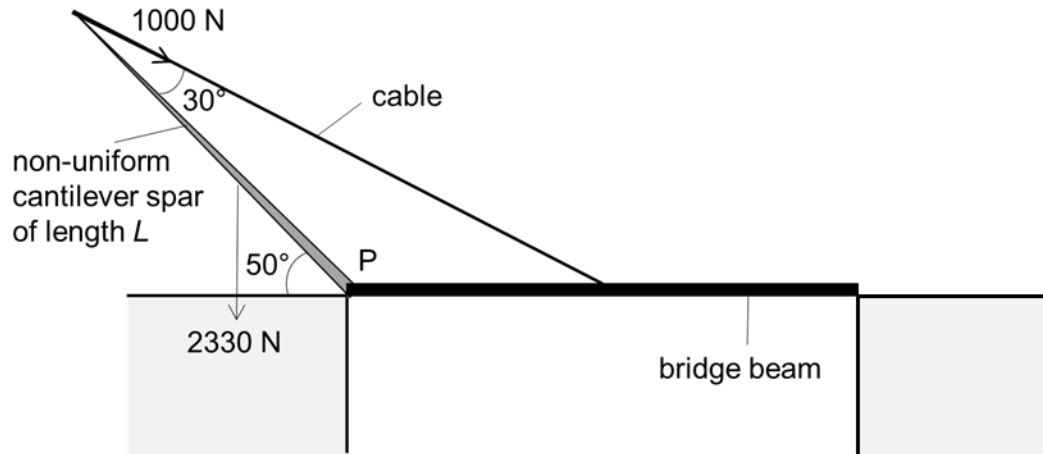


Fig 3.1 (not to scale)

The tension in the cable is 1000 N and the weight of the cantilever spar is 2330 N .

- (a) By taking moments about P, show that the centre of mass of the cantilever spar is located at a distance of $0.33L$ from P.

[3]

- (b) Calculate the magnitude of the force acting on the cantilever spar at P.

magnitude of force at P = N [3]

[Turn over

- (c) The traditional cable-stayed bridge design is shown in Fig 3.2

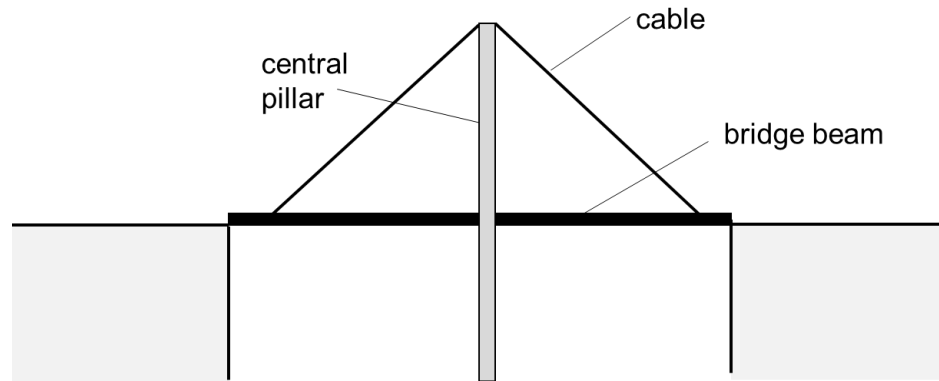


Fig 3.2

Suggest, with a reason, one advantage a cantilever spar cable-stayed bridge may have over a traditional cable-stayed bridge design.

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