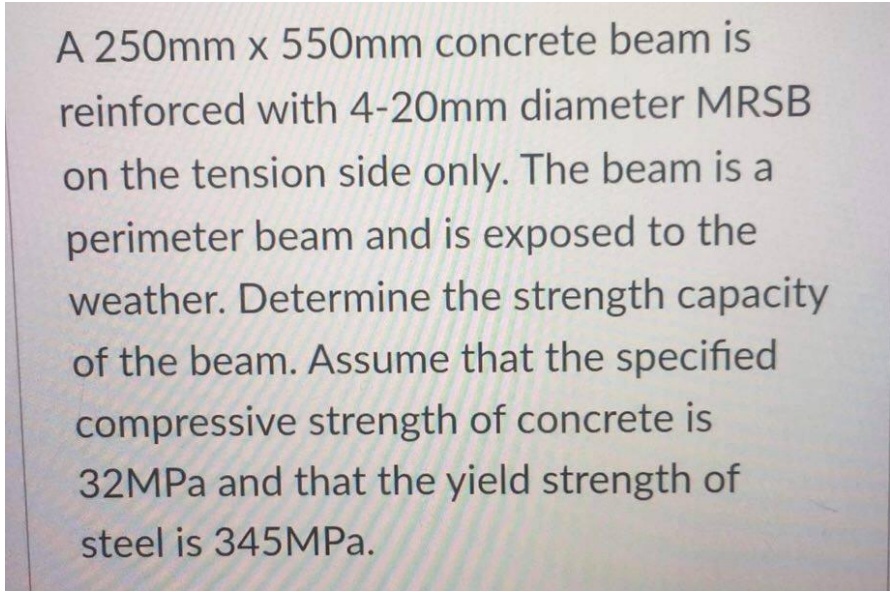


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**Question: A 250mm x 550mm concrete beam is reinforced with 4-20m...**



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**Expert Answer**

 **Anonymous** answered this  
428 answers

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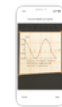
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$f_{ck} = 32 \text{ MPa}$   
 $f_y = 345 \text{ MPa}$

$A_{st} = 4 \times \frac{\pi}{4} (20^2)$   
 $A_{st} = 1256.64 \text{ mm}^2$

$M_{Uc} = 0.36 f_{ck} b d^2 \left( \frac{x}{d} \right) \left[ 1 - 0.42 \left( \frac{x}{d} \right) \right]$

$\frac{x}{d} = \frac{f_y A_{st} (0.87)}{0.36 f_{ck} b d} = \frac{345 (1256.64) (0.87)}{0.36 (32) (250) (515)}$

$\frac{x}{d} = 0.2543$

~~$M_{Uc} = 0.36 (32) (250) (515^2) (0.2543) \left[ 1 - 0.42 (0.2543) \right]$~~

$M_{Uc} = 173.5 \text{ kNm}$

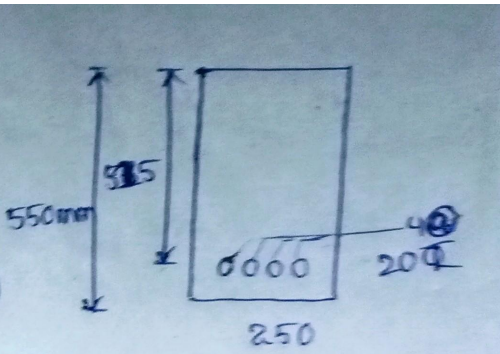
$M_{UT} = 0.87 f_y A_{st} d \left( 1 - \frac{f_y A_{st}}{f_{ck} b d} \right)$

$= 0.87 (345) (1256.64) (515) \left[ 1 - \frac{345 (1256.64)}{32 (250) (515)} \right]$

$M_{UT} = 173.8 \text{ kNm}$

$M_{Uc} \cong M_{UT} = 173.5 \text{ kNm}$

Capacity of the Beam = 173.5 kNm



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### Practice with similar questions

Q: A 350mm x 550mm concrete beam is reinforced with 2-28mm diameter MRSB on the tension side only. The beam is a perimeter beam and is exposed to the weather. Determine the strength capacity of the beam. Assume that the specified compressive strength of concrete is 28 MPa and that the yield strength of steel is 415MPa.

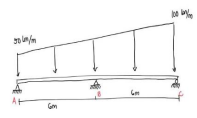
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An Isosceles Trapezoidal Beam is reinforced with 3-20mm diameter MRSB on

An Isosceles Trapezoidal Beam is reinforced with 3-20mm diameter MRSB on the tension side only. The dimensions of the beam in the upper and lower bases are 250mm and 550mm, respectively. The total height of the beam is 630mm and the centroid of the MRSB is located 60

[See answer](#)

100 kn/m 50 kn/m T hun B  
6m A 6m Find : Support Reaction, Ray RBy and



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### Questions viewed by other students

Q: A 4-meter 300mm x 500mm rectangular beam is monolithically casted with a 90mm slab. The beam clear spacing from each other is 3 meters. It is reinforced on the tension side only with 6-32mm diameter MRSB. If  $f_y = 345\text{MPa}$  and  $f_c$  is  $20.7\text{MPa}$ , determine its moment strength capacity. Assume the beam is located inside the building. Use a transverse reinforcement diameter of 12mm.

A: [See answer](#)

Q: 100 kn/m 50 kn/m T hun B 6m A 6m Find : Support Reaction, Ray RBy and Rey Find Magnitude at Span AB and span BC

A: [See answer](#)

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