higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

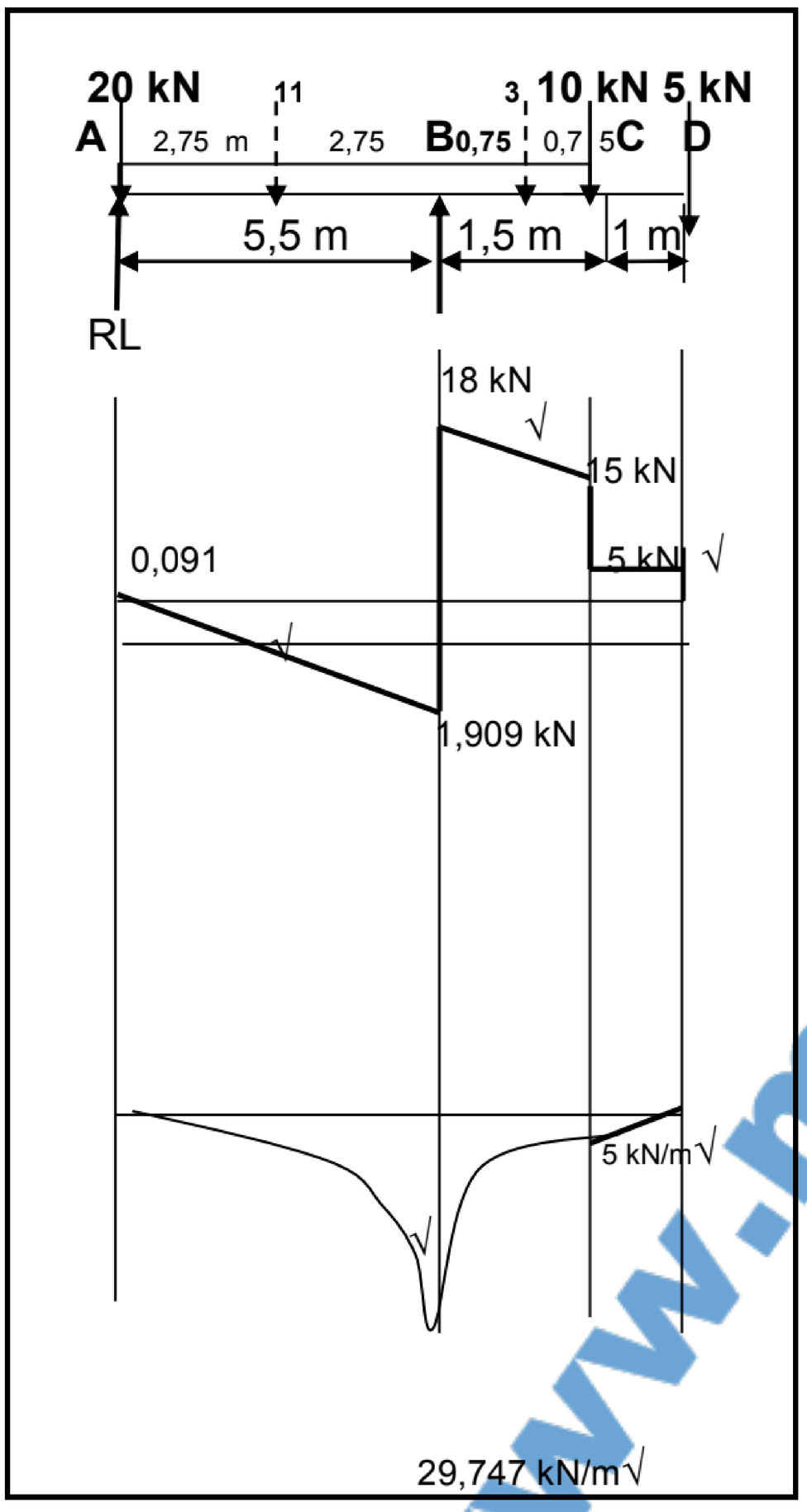
BUILDING AND STRUCTURAL CONSTRUCTION N5

12 APRIL 2019

This marking guideline consists of 8 pages.

SECTION A

QUESTION 1: LOADED BEAM



1.1 Take moment @RR

$RL_{5,5} = \frac{(20 \times 5,5) + (11 \times 2,75) - (3 \times 0,75) + (10 \times 1,5) - (5 \times 2,5)}{5,5}$

RL = 20,091 kN ✓✓

Take moment @RL

$RR_{5,5} = \frac{(11 \times 2,75) + (3 \times 6,25) + (10 \times 7) + (5 \times 8)}{5,5}$

RR = 28,909 kN ✓✓ (4)

1.2 Shear force values

@A = -20 + 20,091 = **0,091 kN** √
A-B = 0,091 – 11 = **-10,909 kN** √
@B = 10,909 – 28,909 = **18 kN** √
B-C = 18 – 3 = **15 kN** √
@C = 15 – 10 = **5 kN** √
@D = 0 (8)

1.3 Bending moment values

BM@ A = **0 kN/m**
BM@ B = (0,091 × 5,5) – (11 × 2,75) = **-29,750 kN/m** √
BM@ C = (-5 × 1) = **-5 kN/m** √
BM@ D = **0 kN/m** (4)

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QUESTION 2: SELECT STEEL BEAM

2.1 Section modules

$$Ze = \frac{BM_{max}}{Pt}$$

$$= \frac{29,75\ kN/m}{155}$$

= 180 MPa✓

New Ze = 226,1✓

Choose size = 203 × 102 × 25,3 kg/m✓ (4)

2.2 Safety factors

$$F_S = \frac{Load}{Area}$$

$$= \frac{18}{203,2 \times 5,8}$$

= 15,272 MPa✓

15,272 MPa✓ less than 100 MPa is OK✓ (4)
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