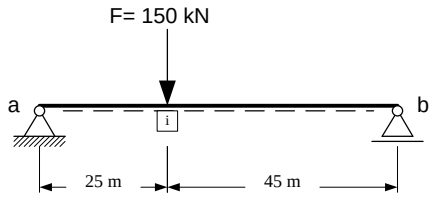
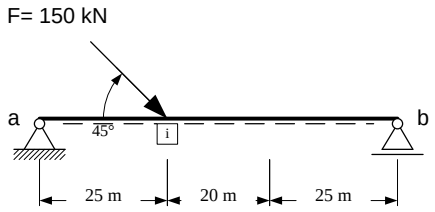
TRAGWERKE- BIEGETRÄGER

1. Aufgabe

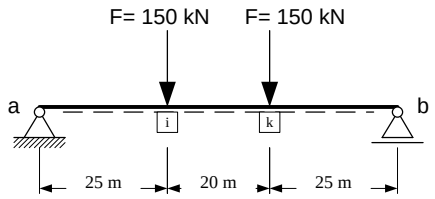
a.



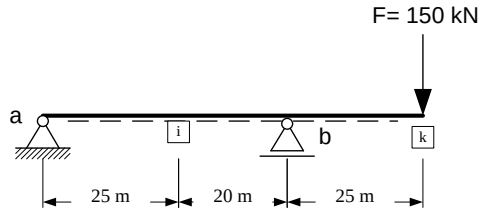
b.



c.



d.



1. Ermitteln Sie die Auflagerkräfte.

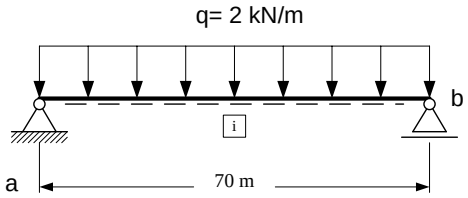
2. Prüfen Sie das Ergebnis mit einer unabhängigen Kontrolle.

3. Ermitteln Sie die Schnittkräfte bei *a, b* und *i, k*.

4. Zeichnen Sie die Schnittkraftflächen *(V-, M-Flächen).*

2. Aufgabe

a.



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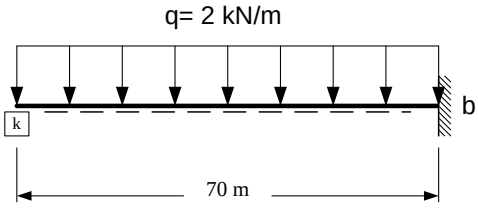
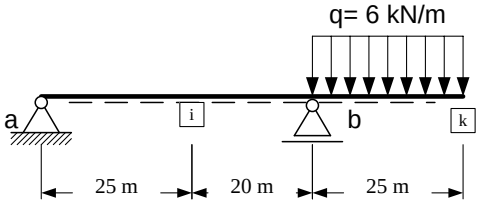
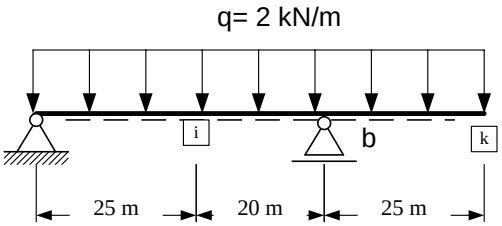


c.



d.



Für alle vier statischen Systeme gilt:

1. Ermitteln Sie die Auflagerkräfte.

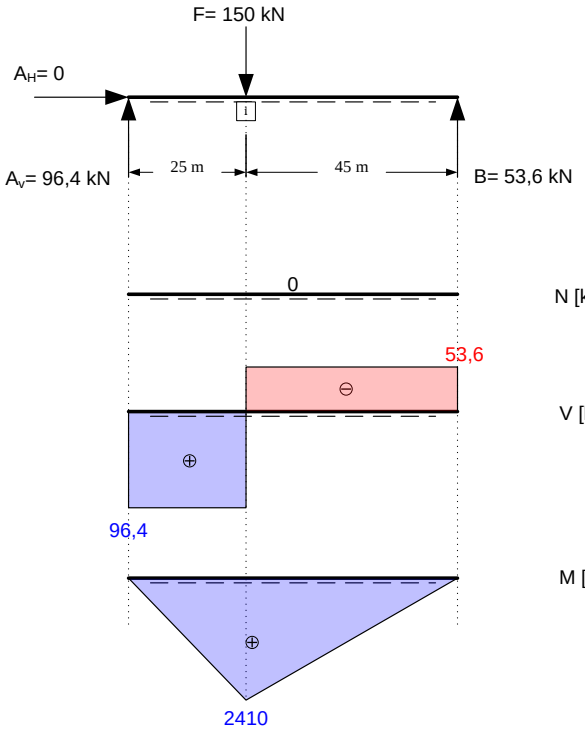
2. Prüfen Sie das Ergebnis mit einer unabhängigen Kontrolle.

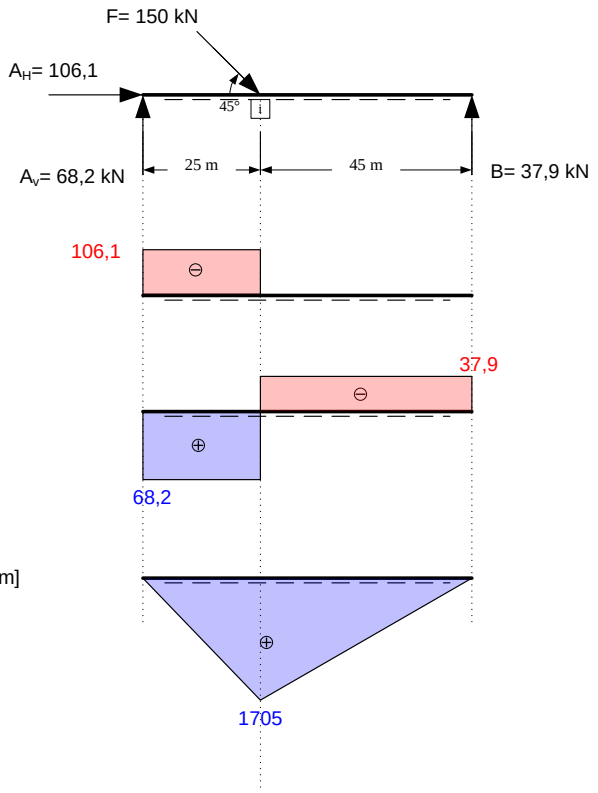
3. Ermitteln Sie die Schnittkräfte bei *a, b* und *i, k*.

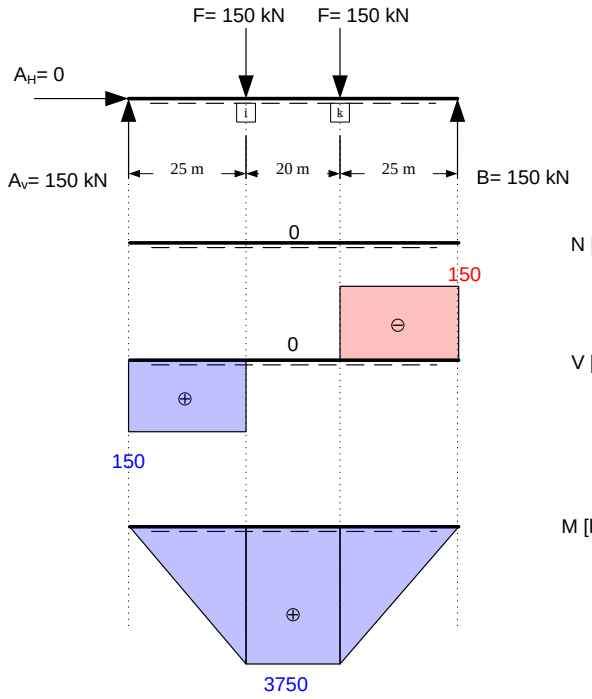
4. Zeichnen Sie die Schnittkraftflächen *(V-, M-Flächen).*

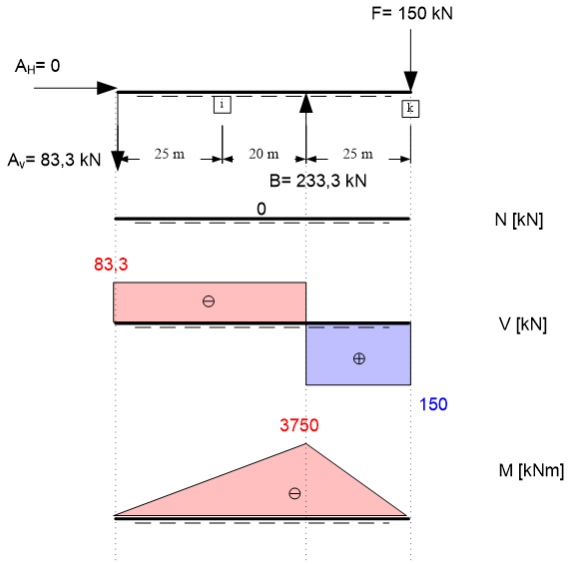
Mechanik und Tragkonstruktion **Übungsumdruck**

Prof. Dr.-Ing. Daniel Pfanner
Prof. Dr.- Ing. Agnes Weilandt









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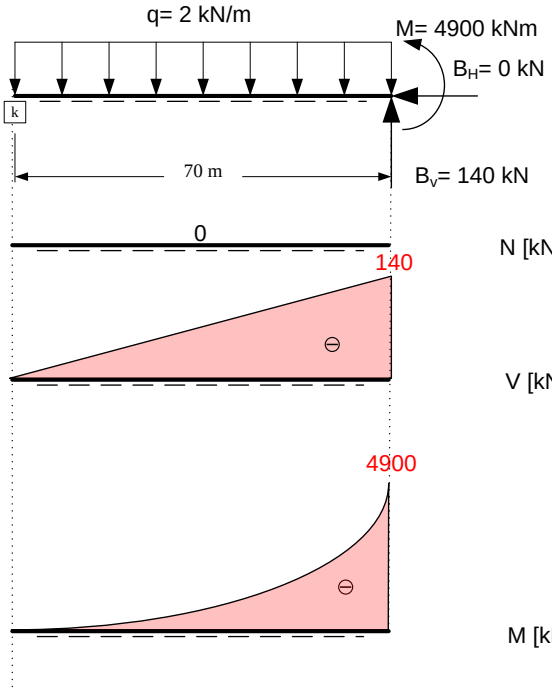
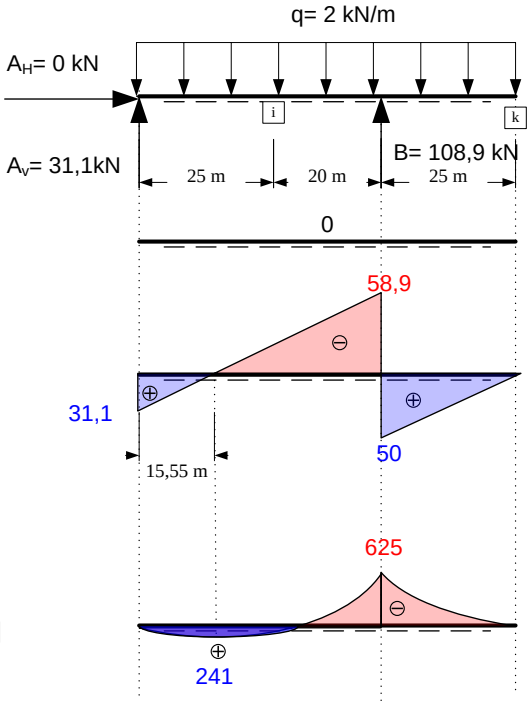
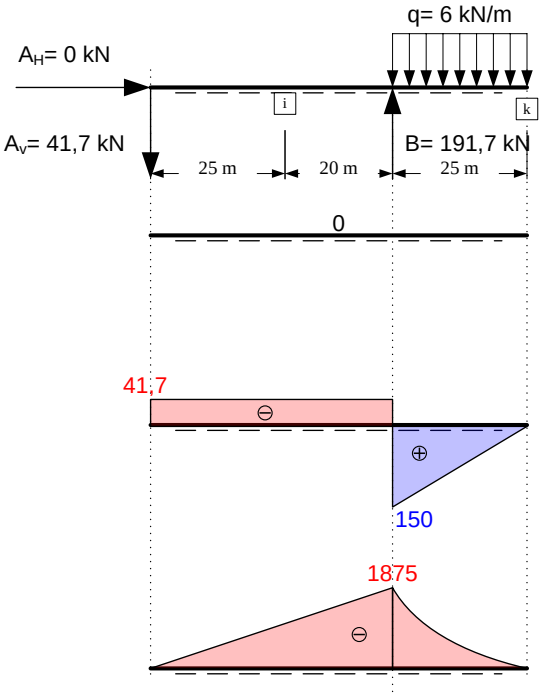
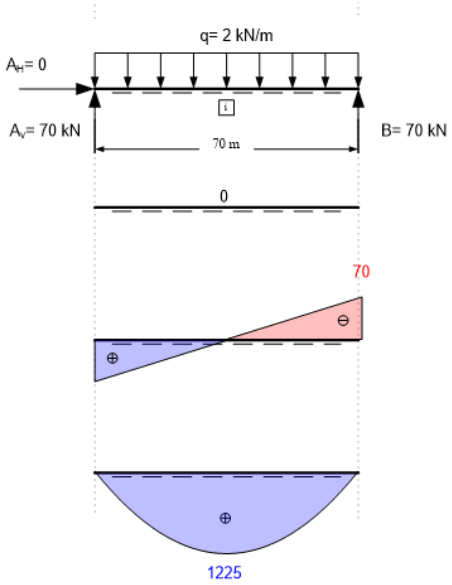
FRANKFURT UNIVERSITY OF APPLIED SCIENCES



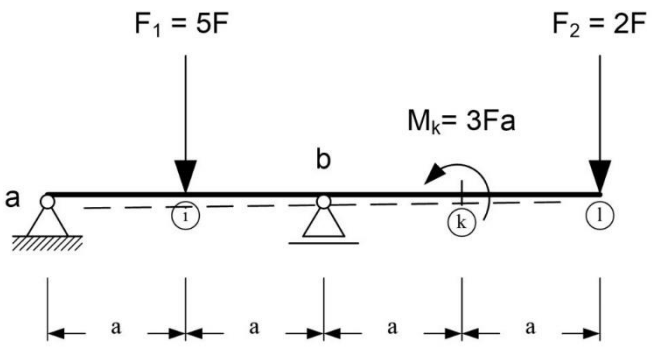




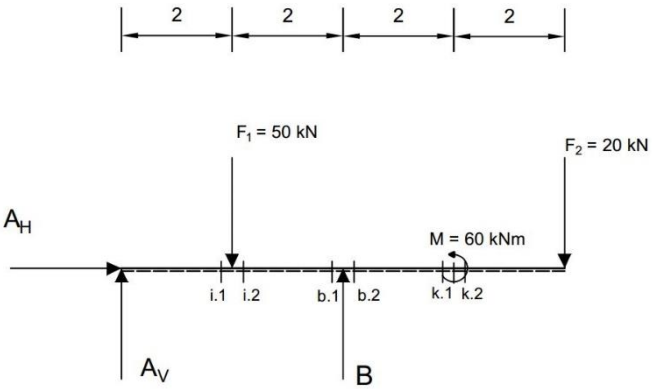


3. Aufgabe

Ein Balken wird durch zwei Einzelkräfte und ein eingeprägtes Moment belastet.
Bestimmen Sie die Schnittkraftverläufe für F= 10 kN und a = 2 m.



Auflagerkräfte



$\Sigma F_X \rightarrow = 0$ $\quad A_H = 0\ kN$

$\circlearrowleft \Sigma M_A = 0$

$B * 4m - 50\ kN * 2m + 60\ kNm - 20\ kN * 8m = 0$

$B = 50\ kN$

$\Sigma F_Z \downarrow = 0$ $\quad A_V + 50\ kN - B + 20\ kN = 0$

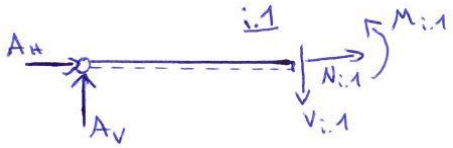
$A_V = 20\ kN$

Schnittgrößen

$N_{i.1} = 0$

$V_{i.1} = A_v = 20\ kN$

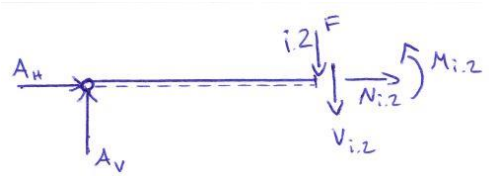
$M_{i.1} = A_V * 2m = 40\ kNm$



$N_{i.2} = 0$

$V_{i.2} = A_v - 50\ kN = -30\ kN$

$M_{i.2} = M_{i.1} = 40\ kNm$

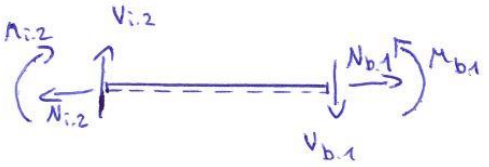


$N_{b.1} = N_{b.2} = 0$

$V_{b.1} = N_{b.2} = -30\ kN$

$\circlearrowleft \Sigma M_{b.1} = 0$ $\quad M_{b.1} - M_{i.2} - (-30\ kN) * 2m = 0$

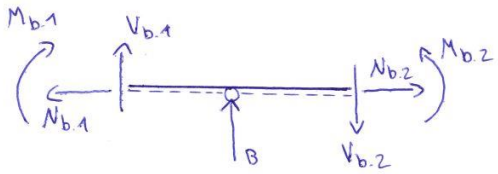
$M_{b.1} = 40\ kNm - 60\ kN = -20\ kNm$



$N_{b.2} = N_{b.1} = 0$

$V_{b.2} = V_{b.1} + B = 20\ kN$

$M_{b.2} = M_{b.1} = -20\ kNm$

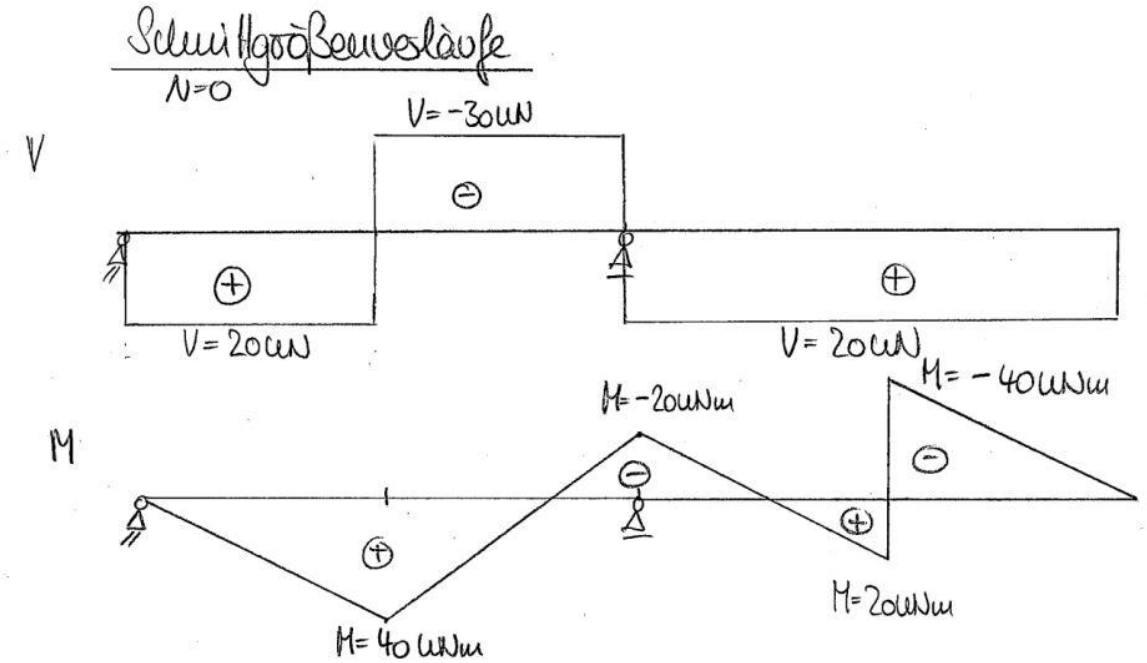


$N_{k.1} = 0$

$V_{k.1} = 20\ kN$

$M_{k.1} = M_{b.2} + V_{b.2} * 2m = 20\ kNm$

$N_{k.2} = 0$

$V_{k.2} = V_{k.1} = 20\ kN$

$M_{k.2} = M_{k.1} - 60\ kNm = -40\ kNm$