The rod CD is welded to end B of the lever AB. If \( \theta = 45^\circ \), calculate the necessary moment \( M \) that equilibrates the system.

Draw the bending moment diagram for CBD.

**Extra:** At what angle \( \theta \) would you get the maximum stress on BD? Why?

\[
X = 0.1 - 0.08 \cos 45^\circ - 0.08 \cos 45^\circ
\]

\[
X = -0.0131 \text{ (is to the left)}
\]

\[
\sum M_A = 0 \Rightarrow -M_A + D \times + 150N \times 0.1
\]

\[
M_A = D \times + 15N m
\]

\[
\Rightarrow D = 150N \times \tan 45^\circ = 150N
\]

\[
\text{at BD}
\]

\[
\therefore M_A = 150N \times 0.0131m + 15N m
\]

\[
M_A = 16.97 N.m
\]