



# NCCCO Mobile Crane Operator Core written exam study checklist

Built from the NCCCO Mobile Crane Operator Candidate Handbook Core exam outline (revision 01/25), the Core written exam (read 17 Oct 2026 on NCCCO's candidate handbook).

Core written exam: 95 questions in 90 minutes, no calculator allowed. Each specialty written exam is separate.

One line per thing to be able to do, grouped under the four areas NCCCO lists for the Core written exam. Load charts and operations carry the most weight. Tick a line when you can do it without notes.

## Site

- ☐ Check ground conditions before a lift: firmness, level, and buried or overhead hazards.
- ☐ Plan outrigger setup, and say what changes when the ground or the pads are poor.
- ☐ Name the steps for working near power lines, using the distances your rules and employer give.
- ☐ Work with a signal person, and recognise the standard hand signals.
- ☐ Say what to cover with the crew before a lift starts.

## Operations

- ☐ Describe a pre-shift inspection, and what to do when you find a defect.
- ☐ Explain safe start-up, swing, travel and shutdown.
- ☐ Say how wind, weather and travelling with a load change a lift.
- ☐ Inspect a sling, and choose between a choker and a basket hitch.
- ☐ Explain two-blocking and how to prevent it.
- ☐ Explain side loading and why it is avoided.
- ☐ Say what a rated capacity indicator and a limiter each do, and what they cannot do.

## Technical Knowledge

- ☐ Name the main parts of a mobile crane: boom, jib, hoist line, counterweight and outriggers.
- ☐ Explain the tipping axis and load moment, and the difference between stability limits and structural limits.
- ☐ Show how boom length, boom angle and radius relate, and what happens to capacity as radius grows.
- ☐ Explain parts of line and what they do to line capacity.
- ☐ Find the weight of a load and the effect of its center of gravity on the pick.

## Load Charts

- ☐ Find the gross capacity at a boom length and radius, including between two chart rows.
- ☐ Take the hook block, rigging and attachments off gross capacity to get net capacity.
- ☐ Tell the stability-limited part of a chart from the structure-limited part.
- ☐ Read the chart notes: configuration, counterweight, outrigger position and working area.
- ☐ Check the parts-of-line limit as a separate step.
- ☐ Work out whether a load fits, and what percent of capacity it uses.

## Formulas to work by hand

Angles are measured from the horizontal. Weights are in the same unit throughout. The Core written exam allows no calculator, so work each one by hand.

### Net capacity

net = gross capacity from the chart - hook block - rigging - any attachment deduction the notes list

### Percent of capacity

load alone against net:  $\text{load} / \text{net} \times 100$

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load plus every deduction against gross:  $(\text{load} + \text{deductions}) / \text{gross} \times 100$   
do not put the load alone over gross

### Sling angle factor

factor =  $1 / \sin(\text{angle from horizontal})$ ; use cos instead when the angle is measured from vertical  
tension in a leg = its share of the load x factor

Formulas as worked in our gross vs net capacity and sling angle factor guides, which cite OSHA 29 CFR 1926.251, the U.S. Department of Energy's Hoisting and Rigging Fundamentals and the NCCCO candidate handbook. Always use the chart and tags for the crane in front of you.

## Check your numbers

[Load chart practice: boomangle.com/tools/load-chart-practice](https://boomangle.com/tools/load-chart-practice)

[Net capacity calculator: boomangle.com/tools/net-capacity-calculator](https://boomangle.com/tools/net-capacity-calculator)

[Crane percent of capacity calculator: boomangle.com/tools/crane-percent-of-capacity-calculator](https://boomangle.com/tools/crane-percent-of-capacity-calculator)

[Sling angle calculator: boomangle.com/tools/sling-angle-calculator](https://boomangle.com/tools/sling-angle-calculator)

[Parts of line calculator: boomangle.com/tools/parts-of-line-calculator](https://boomangle.com/tools/parts-of-line-calculator)

## Read next

[NCCCO Core written exam guide: boomangle.com/guides/nccco-core-written-exam](https://boomangle.com/guides/nccco-core-written-exam)

[How to read a crane load chart: boomangle.com/guides/how-to-read-a-crane-load-chart](https://boomangle.com/guides/how-to-read-a-crane-load-chart)

[Gross vs net capacity: boomangle.com/guides/gross-vs-net-capacity](https://boomangle.com/guides/gross-vs-net-capacity)

[Sling angle factor: boomangle.com/guides/sling-angle-factor](https://boomangle.com/guides/sling-angle-factor)

[Crane capacity deductions: boomangle.com/guides/crane-capacity-deductions](https://boomangle.com/guides/crane-capacity-deductions)

## How to use this checklist

- Take the free 10-question check first and start with the area it shows as weakest.
- Work each load chart problem by hand with a practice chart, then check it with the matching calculator.
- Say each hand signal and each deduction out loud until you can do it without notes.

### Ready to test yourself? 10 free NCCCO Core questions

Find your weakest topic in minutes. Every answer is explained as you go, and there is no signup.

[Take the free check: boomangle.com/nccco-written](https://boomangle.com/nccco-written)

[Core + Specialty course: \\$99. Lessons, practice exams and a study plan.](#)