

# Suspended access equipment—Counterweights

## Explain dangers

Without the right number of counterweights, suspended access equipment (SAE) can fail, leading to injury or death.

## Identify controls

Here is how to calculate the number of counterweights you need to support the SAE.

Since we need to build in a safety factor of 4, the effect of the counterweights holding the equipment up must be at least 4 times greater than the load pulling the equipment down.

Another way of saying this is:

- Multiply the load of the counterweights by the distance of the outrigger beam from the fulcrum to the centre of the counterweights (L).
- This number must be at least 4 times greater than the distance of the outrigger beam from the fulcrum to the suspension point (X) multiplied by the capacity of the SAE.

Let us look at an example:

1. The outrigger beam is 18 ft. long. At least 2 ft. of space is required by the counterweights at one end of the beam (CWL). There is 1 ft. of overhang at the other end of the beam after the fulcrum.

$$18 \text{ ft. (beam)} - 1 \text{ ft. (centre of CWL)} - 1 \text{ ft. (X)}$$

**L = 16 ft.**

2. The SAE can support a load of 1,000 lb. (LL). The distance from the fulcrum to the suspension point is 1 ft. (X). Multiply these numbers to get the maximum force that will be pulling down.  
 $1,000 \text{ lb. (LL)} \times 1 \text{ ft. (X)} = \mathbf{1,000 \text{ ft. lb.}}$
3. The resisting force that is holding up the SAE must include a safety factor of 4.  
 $1,000 \text{ ft. lb.} \times 4 \text{ (SF)} = \mathbf{4,000 \text{ ft. lb.}}$

4. The load required by the counterweights is determined by dividing the resisting force by the distance on the beam from the centre of counterweights to the fulcrum (L).

$$4,000 \text{ ft. lb.} \div 16 \text{ ft. (L)} = 250 \text{ lb.}$$

5. Assuming the counterweights are 55 lb. each, here are the number required.

$$250 \text{ lb.} \div 55 \text{ lb.} = 5 \text{ counterweights}$$

Before deciding whether or not to add more counterweights, keep in mind that every manufactured steel outrigger beam has a defined limit to the number of counterweights that can be placed and secured on it. This limit must be indicated on the beam label.

If labels on an outrigger beam are missing or not readable, do not use the beam.

Remember to only use counterweights that have been specifically manufactured for the particular outrigger beam you are using.

Counterweights should be securely attached to the outrigger beam so that the vibration or movement of the beam will not dislodge or move them.

## Demonstrate

Demonstrate as you talk. Calculate the number of counterweights required for SAE on the site.

