

## Communication skills 1

Through a newspaper article of Pollok (2018), it appears that the construction industry is constantly evolving, and proportion of buildings built from prefabricated elements is increasing. The construction elements are getting bigger and heavier, and more lifting capacity is needed more than ever. Today's tower cranes has a large turning radius, but they have their limitations when it comes to lifting capacity. This problem is solved today with large mobile cranes that can lift heavy. But this is a problem when it comes to tight construction sites, as well as being expensive. Therefore, in cramped construction sites it is absolutely necessary to increase the capacity of the tower cranes.

The lifting capacity of tower cranes is limited due to the danger of overturning. A crane's capacity is measured in metric tons. The further out the load works the lighter the load must be. This is because of the bending moment that occurs at the crane structure that leads to danger of overturning. Today's cranes have a fixed ballast or weights where its only possible to do smaller adjustment who is also consuming. So the momentum due to the ballast will be that same at all time unless one changes the weights.

What if we could develop a flexible counter jib or more specific a flexible moment arm. The principle of leverage gives us that the effect of an adjustable counterweight will be a solution. With an adjustable counterweigh the crane would be able to provide higher or lower bending moment from the ballast at the counter jib depending on the position and weight of the load at the trolley.

The idea is a computer that calculates the crane's exposure to the weight and position of the load, and then adjust a hydraulic telescopic arm that pushes the ballast outwards at higher bending moments and draws the ballast into lower bending moment. The fact that the crane is always balanced minimizes the risk of overturning and thus increases the crane lifting capacity.

### Sources

Pollok, M. (2018). High-rise challenges for tower crane designers. Available from: <https://www.khl.com/access-lift-and-handlers/high-rise-challenges-for-tower-crane-designers/132920.article> (retrieved 02.10.2019)