

## SUMMARY

*background* Four rope grabs are used as a crane tool for loading and unloading bulk carriers. In general, grab designs have improved as a result of trial and error, however research has had some influence as well. Although the basic principle has remained unchanged, grab design has improved drastically, thereby increasing grab efficiency.

*objective* The research presented in this report aims at building a virtual model of a grab and validating this model by comparing simulation results to data of other research on grabs.

*procedures* Microsoft Excel sheets are used as a design environment, but mainly the multi body simulation software ADAMS is being used. The models are parametrical, in order to easily adapt the model to different grab configurations. Soil characteristics will also be adjustable between the simulation runs. Thereby creating a range of potential simulation runs.

*conclusions* The cutting tips of the grab will sink less deep into the soil and the buckets are retracted from the soil at an increasing distance from the symmetrical axis of the grab, when a soil with higher digging resistant forces is excavated.

With a larger number of sheaves in the sheave block combination, the span distance at which the force in the closing cables reaches its maximum, is increasingly longer. This implies that with an increase in number of sheaves the potential cutting forces are larger.

Cutting forces are limited and at maximum equal to the lifting weight of the grab.