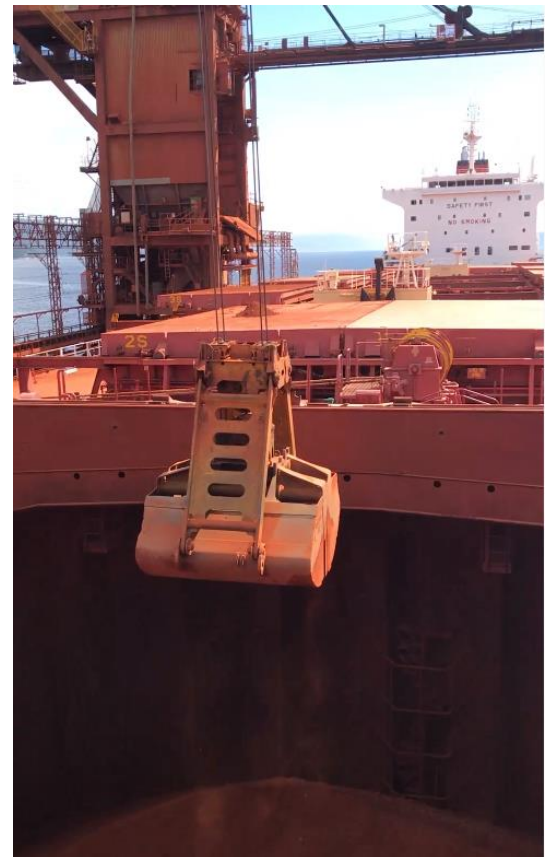


Clamshell bucket (grab bucket) unloaders are the workhorses of the material handling industry and are used for unloading many materials including coal, grain, lime, sugar, and more. Capable of moving multiple tons of material in a single grab, it is no wonder why clamshell buckets are relied on heavily. However, many of these giants have been in service for several decades with the original or the nearly original control systems in place. With antiquated control system components such as drives, load-share boards (black box), PLCs, or motors, one failure can mean devastating and costly down-time.

At Prokuma, we have successfully upgraded many grab bucket unloaders and their supporting equipment's control systems including:

- Hold and close DC drives with unbalanced load sharing
- Electrical enclosure builds and rebuilds
- Programmable encoder-based limits for easy cable replacement
- Trolley drives with anti-swing technology
- Barge hauls with tension control
- Automatic dumping take-over
- Safety design
- IP cameras for monitoring conveyors and motor rooms
- PLC based control systems
- PLC-free control systems
- Operator chairs and joy sticks with dig mode
- Flat-Close bucket mode
- Slack prevention
- Collision prediction and prevention
- Operator interface screens
- Tonnage reporting
- Localization for easy troubleshooting in your language



Our designs are proven using several major brands and models including:

- Allen-Bradley [PowerFlex DC](#)
- Siemens [Sinamics DCM](#)
- ABB [DCS](#)

Call for a quote: 1 812-461-1681 (1 812-568-1746) or email questions to [sales@prokuma.com](mailto:sales@prokuma.com)

## Slack Prevention

Slack in the hold and close cables marginally increases unloading time every time the operator must recover the slack prior to resuming unloading. This can lead to many hours of additional unloading time. Our slack prevention algorithms allow for full unloading capabilities without compromising speed. The following actions are typically responsible for the introduction of slack in one of the cables.

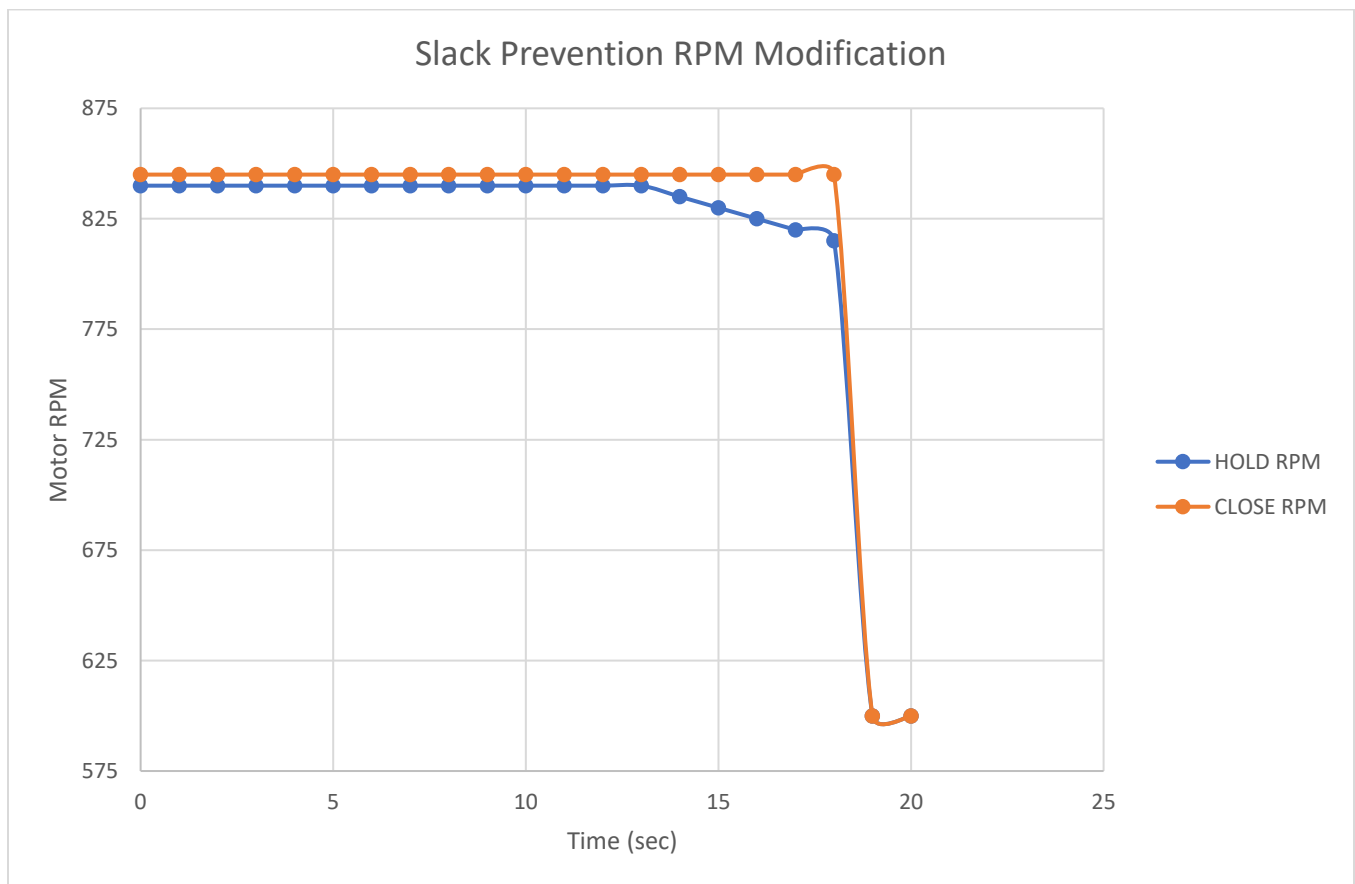
Dumping

Descending while opening or closing

Closing

Digging

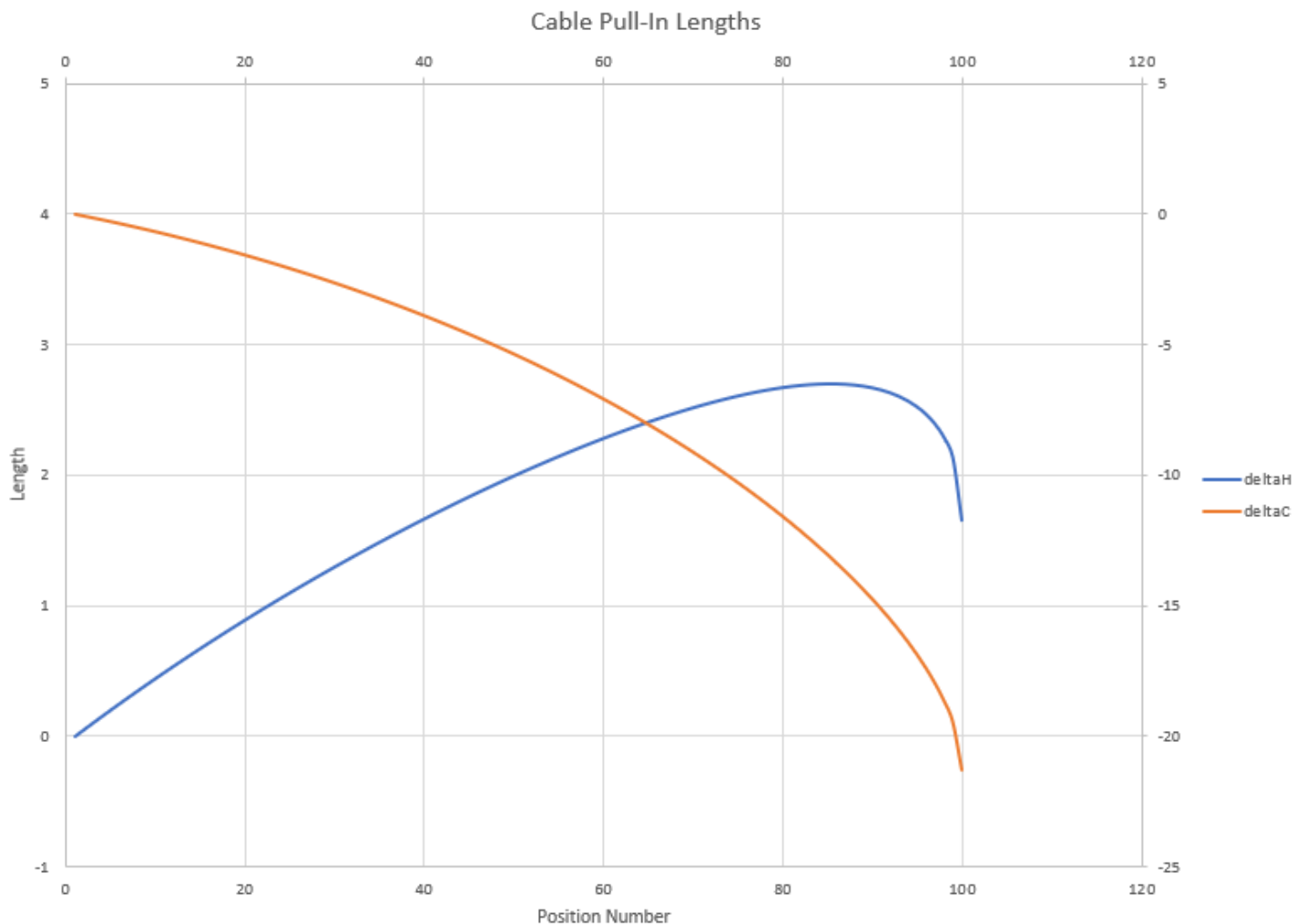
Our slack prevention algorithms predict when the hold or close cable will become slack at any operating speed and the respective motor is disallowed to continue motion in the direction that produces slack under any given circumstance. This allows the operators to plan the next action instead of figuring out how to complete the previous.



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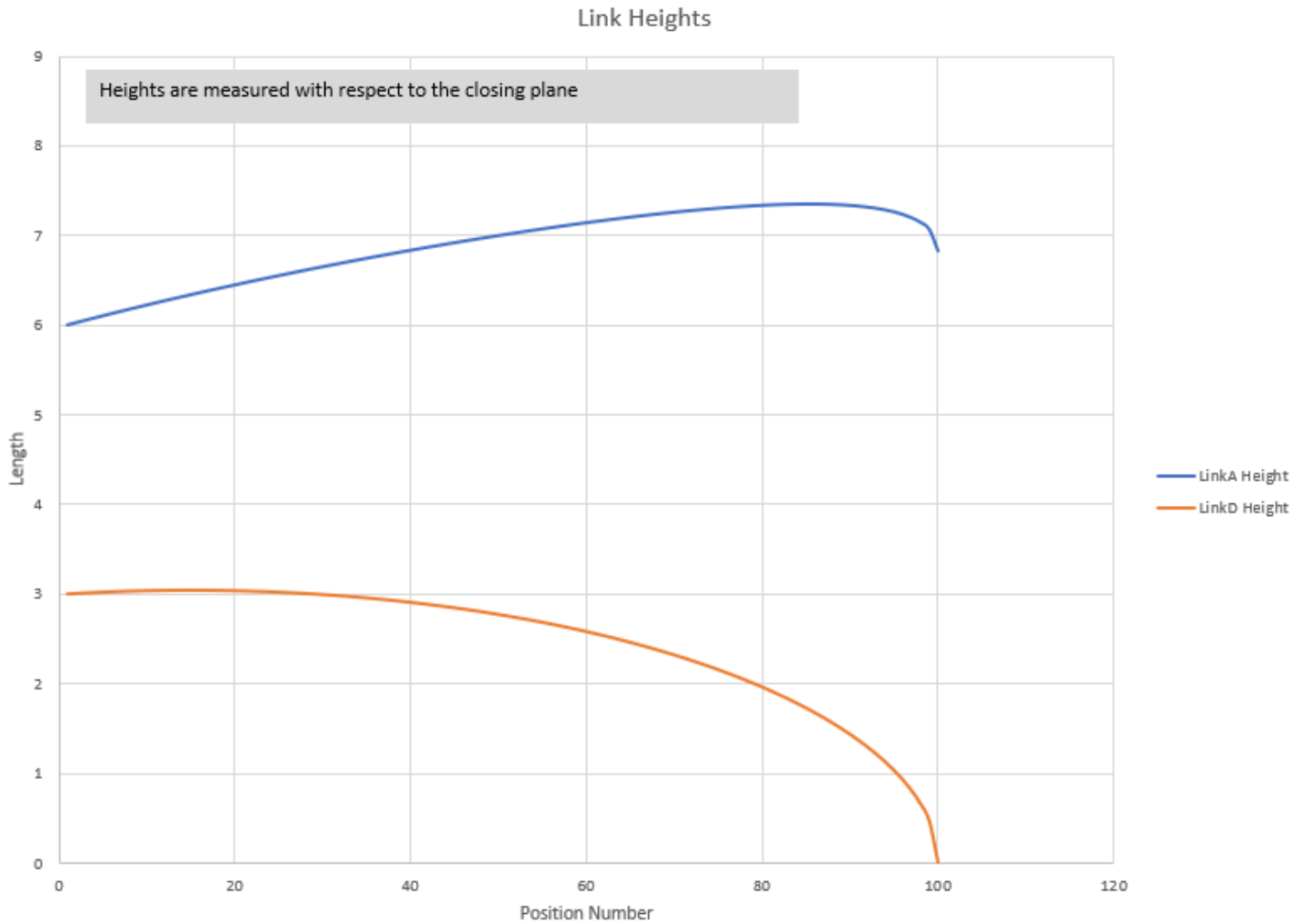
## Flat-Close

Our complete understanding of the physical characteristics of grab buckets gives Prokuma the advantage and ability to deliver a superior control system. Our proprietary, parameterized analysis tools allow us to make control decisions based on exactly where the grab bucket is in relation to any defined point in the system. This allows our grab bucket control system to avoid unnecessary transfer of weight to the hull of a ship or barge and eliminate collisions with equipment.

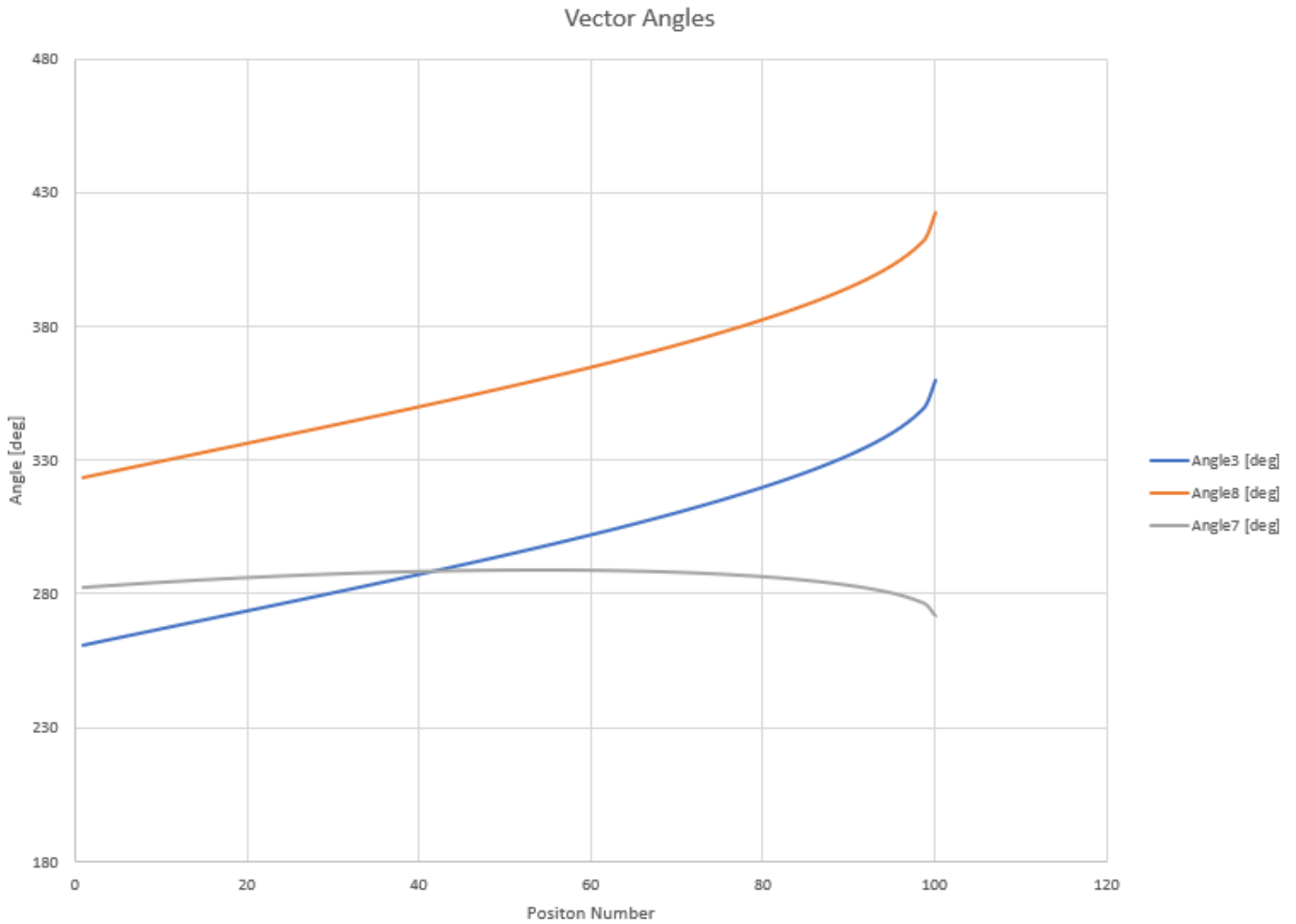


Our Flat-Close mode takes guess work and re-work out of the operator's hands. By closing the grab bucket along a horizontal plane corresponding to the position of the edge of the bucket's mouth at the start of a Flat-Close operation, cleanup of the vessel has never been easier.

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