Swing Free – Industrial Crane Technology

Control System and Method for Payload Control in Mobile Platform Cranes

Description

Using input shaping algorithms this invention isolates the payload and flexible link from platform motion throughout a desired payload motion. It includes a control system and method for generating crane commands from operator input for substantially pendulation-free payload motion, even when the crane is mounted on a moving platform.

Swing Free Technology Enabling Features and Benefits

- *Increases cargo transfer rate by 4x, improving overall system economics*
- *Enables more difficult cargo transfers (e.g. to and from moving platforms)*
- *Increases system performance through more accurate and stable transfer and placement*
- *Improves safety by filtering crane operator input*
- *Eliminates residual oscillation of suspended payloads*
- *Compensates for complex, real world variations*

Performance Capabilities

- *Operator commands are filtered to provide a swing-free maneuver*
- *System for swing-damping movement of suspended objects*
  - *force servo-damping and a six-axis robot controller are used to control a gantry manipulator*
  - *provides point-to-point, computer generated swing-free maneuvers*
- *Operator control systems and methods for swing free, gantry-style cranes*
  - *damping payload sway in cranes with payload suspended from a trolley by multiple, variable-length cables*
- *Sway-control method and system for rotary cranes*
  - *sway-damping of a payload suspended by a variable-length line from the trolley of a rotary jib crane*

Platform Applications

Overhead cranes
Rotary boom cranes
Rotary jib cranes

Readiness Level

Demonstrated in ship to ship in sea trials
Demonstrated in ship to shore trials

Business Opportunity

- *Leverages a $6M Funding investment*
- *Strong Internal SNL Support*
- *Merchant and Military Logistics Applications*
- *Metropolitan Commercial Construction Applications*
- *Improves Overall Crane System Economics*

Sponsors

- *Office of Naval Research's Advanced Shipboard Crane Motion Control System ATD*
- *Naval Surface Warfare Center–Carderock*

***Intellectual Property Position*: 5 US Patents, 1 Software package - Unencumbered – Strong, Novel Position**

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
Sandia National Laboratories, Licensing and Intellectual Property Management Organization
Nathan L. Golden, Licensing Executive: 505.845.9737 nlgolde@sandia.gov