



KRANUNION

## EFFICIENCY IN BULK HANDLING

The 12<sup>th</sup> Trans Middle East 2016

27.10.2016, Jeddah, Saudi Arabia

# KRANUNION XL-ENGINEERING

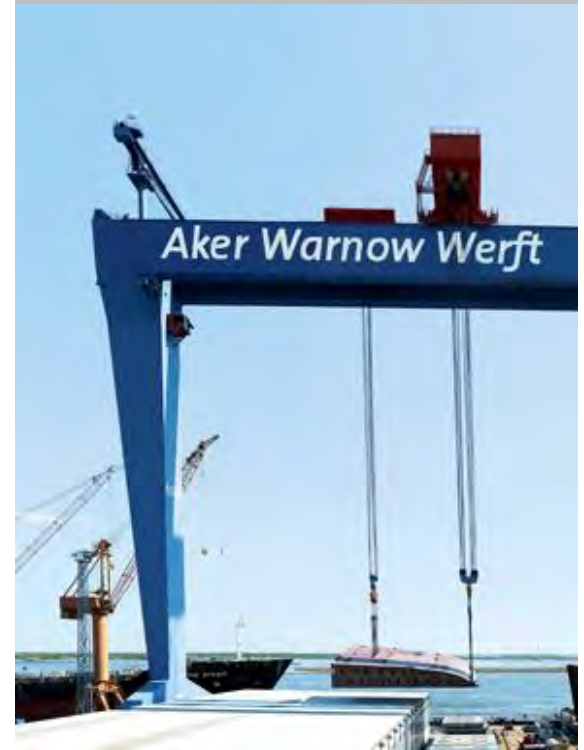


KIROW, ARDELT AND KOCKS ARE MEMBERS OF KRANUNION.

# KRANUNION XL-ENGINEERING



# THE MEMBERS OF KRANUNION



KIROW, ARDELT AND KOCKS ARE MEMBERS OF KRANUNION.

# WORLD MARKET LEADER UNITED

KIROW - is the world market leader for railway  
cranes and slag pot carriers.



KIROW, ARDELT AND KOCKS ARE MEMBERS OF KRAMUNION.

# WORLD MARKET LEADER UNITED

ARDELT - is the world market leader for  
double jib level luffing cranes.



KIROW, ARDELT AND KOCKS ARE MEMBERS OF KRANUNION.

# WORLD MARKET LEADER UNITED

KOCKS - is the world market leader for Goliath cranes and a pioneer in the development of container cranes.



KIROW, ARDELT AND KOCKS ARE MEMBERS OF KLANUNION.

# INDUSTRY FOCUS

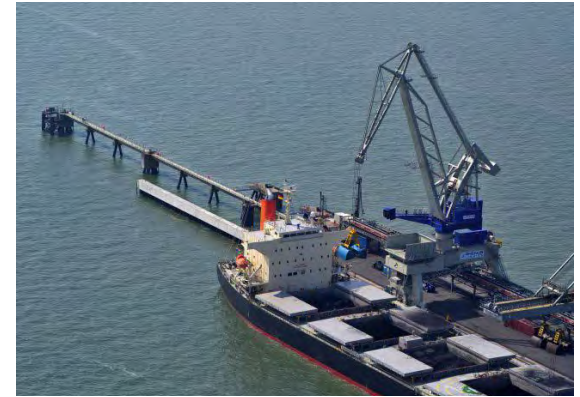
BETTER UNDERSTANDING OF THE LOGISTICS PROCESS



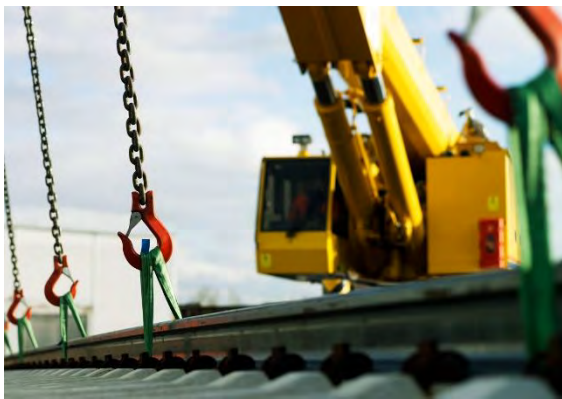
Steel mill



Shipyard



Bulk handling



Tracklaying



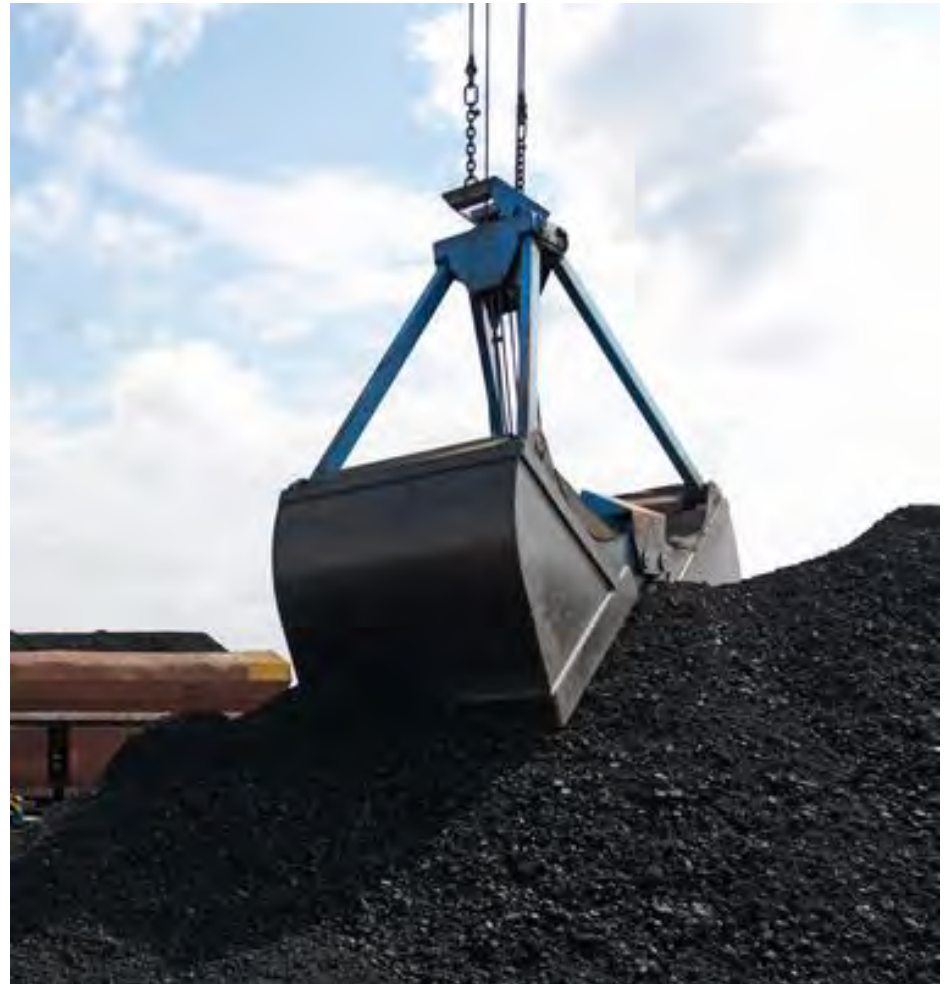
Container handling



General cargo handling



# BULK HANDLING



# INTRODUCING THE TUKAN-K FROM ARDELT



# ARDELT HISTORY



1902 – founded by Robert ARDELT

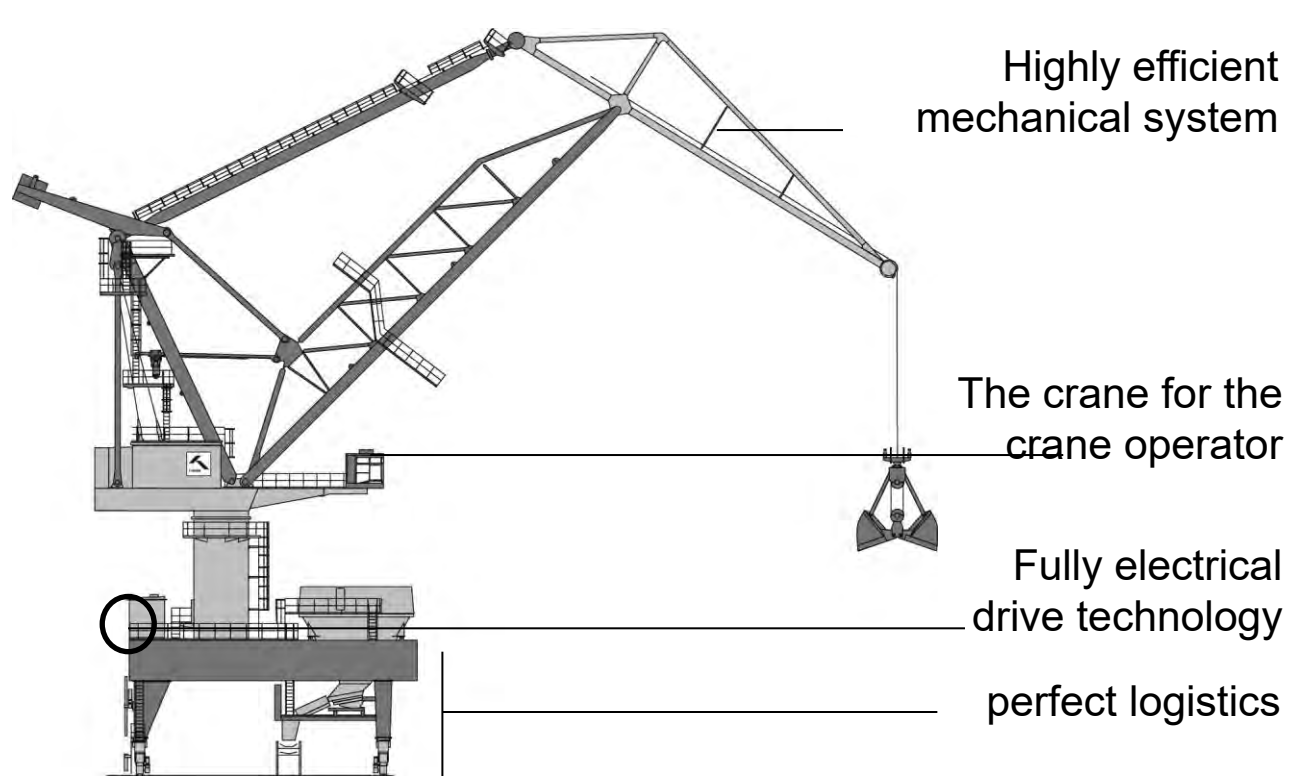
1936 – grant of the patent for the articulated luffing jib system



# XL EFFICIENCY FOR THE MOST MODERN TERMINALS



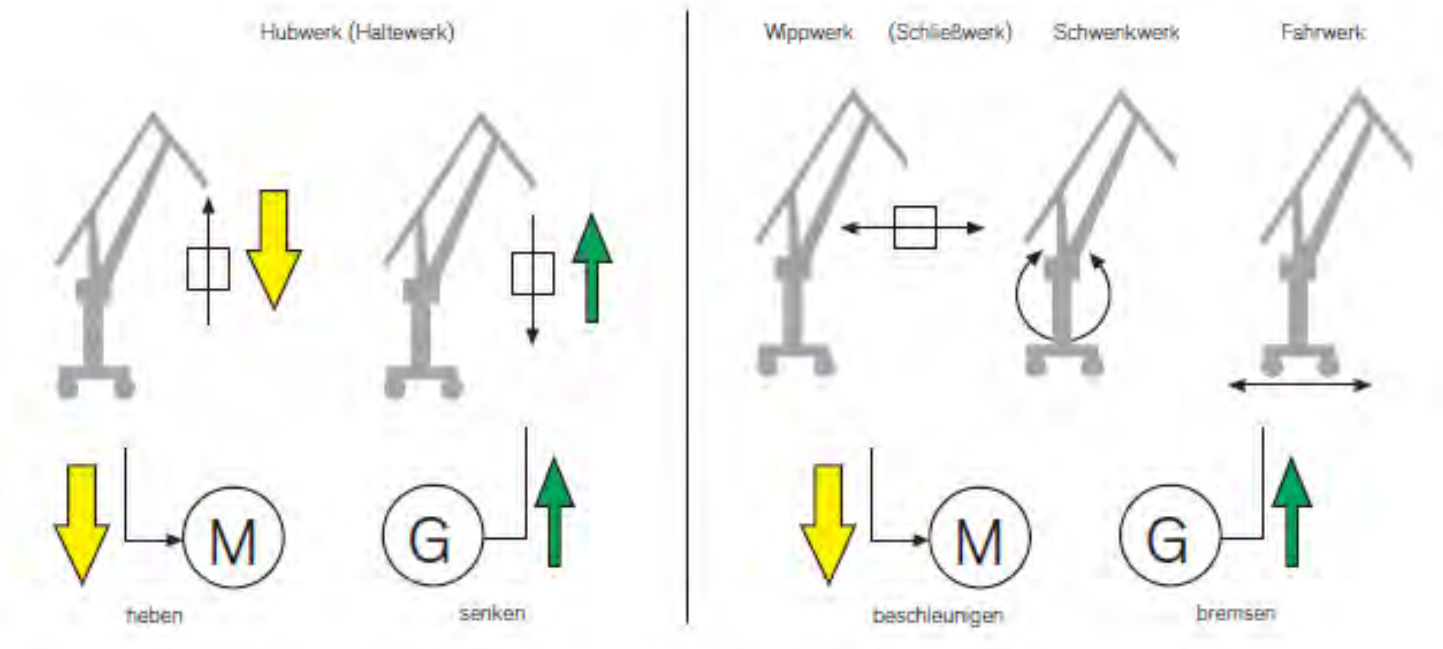
The adaptive crane –  
model series Tukan K



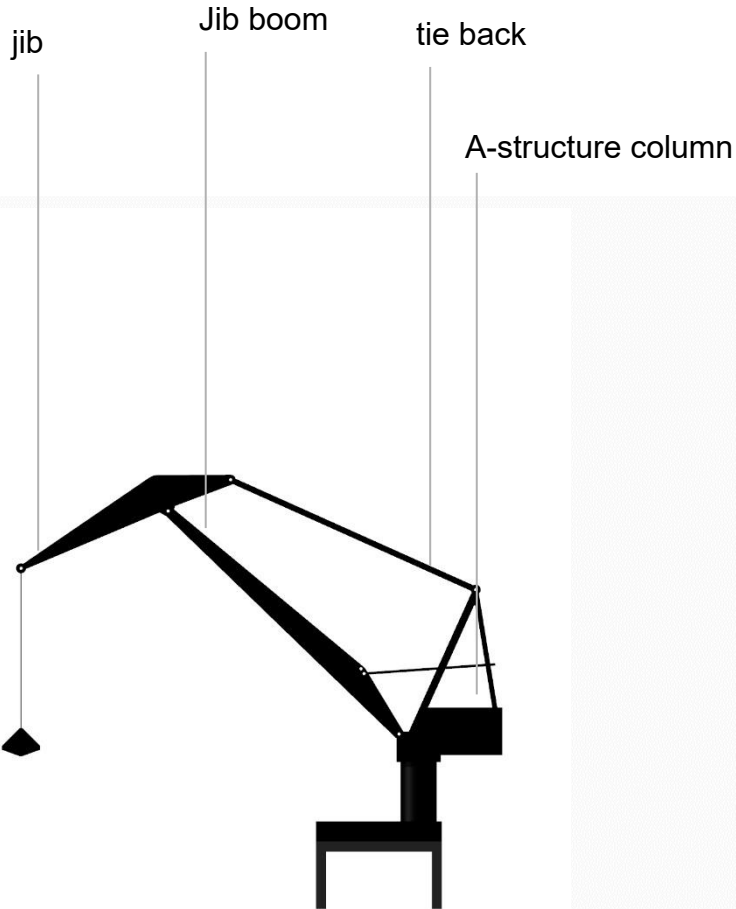
# FULLY ELECTRICAL DRIVE TECHNOLOGY



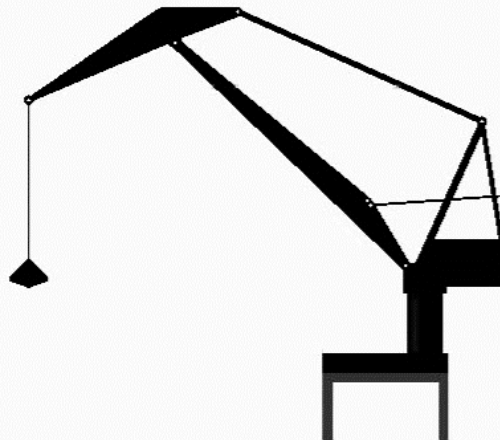
Energy recuperation during fully electrical operation



# HIGHLY EFFICIENT MECHANICAL SYSTEM



Principle of articulated jib motion

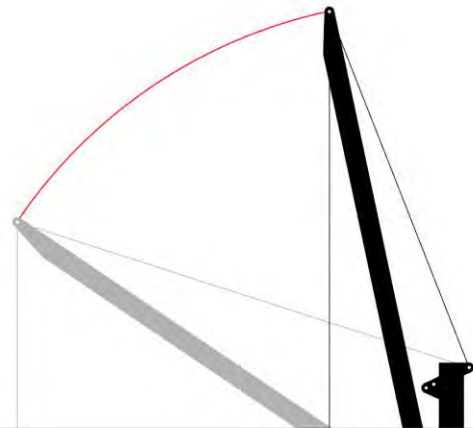


# HIGHLY EFFICIENT MECHANICAL SYSTEM



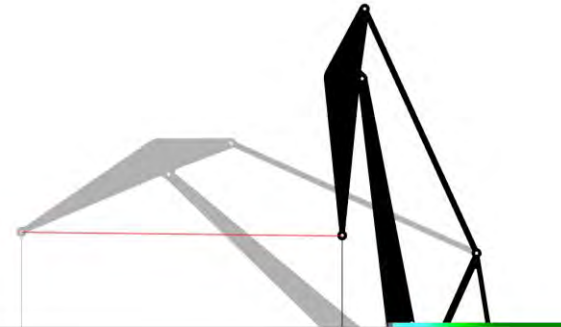
## Luffing systems

Circular arc around the base point of the jib



Crane with rope luffing system

Almost horizontal loading path

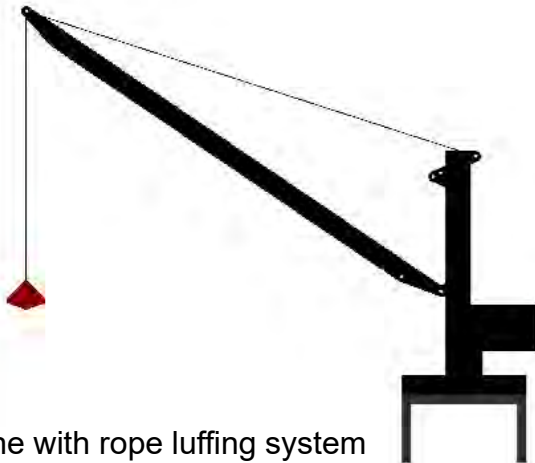


Crane with articulated jib system

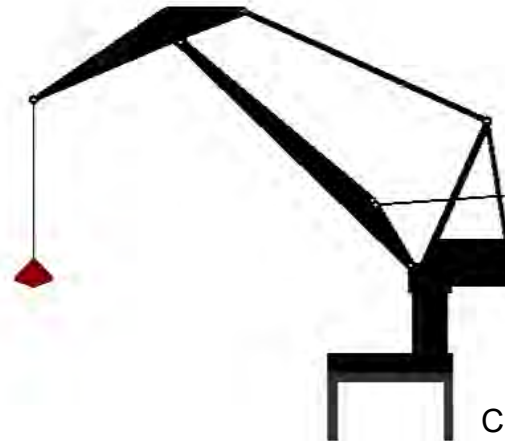
# HIGHLY EFFICIENT MECHANICAL SYSTEM



Comparison of the load way without rope compensation  
on the crane with rope luffing system



Crane with rope luffing system



Crane with articulated jib system



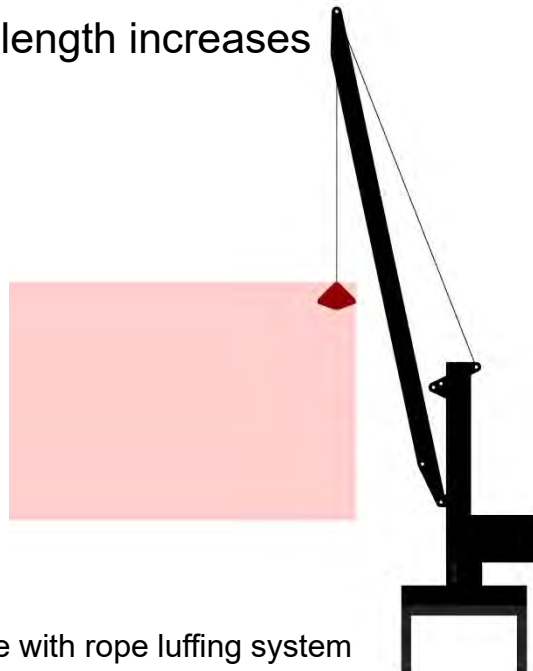
# HIGHLY EFFICIENT MECHANICAL SYSTEM



Comparison of the load way

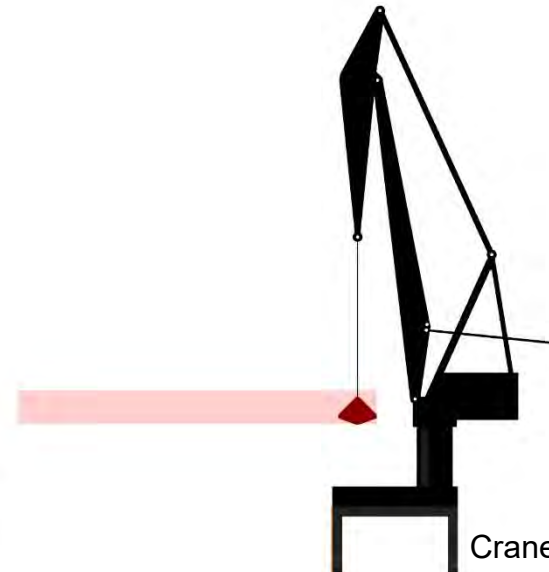
Without rope compensation

→ Swinging rope's length increases



Almost horizontally load guidance

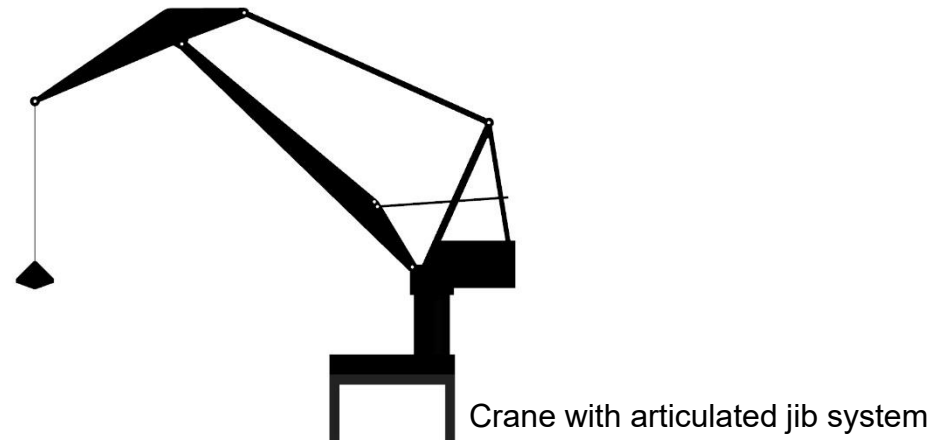
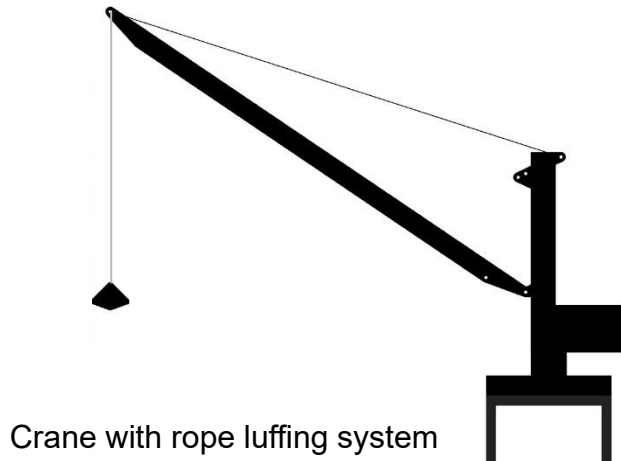
→ Saving of energy



# HIGHLY EFFICIENT MECHANICAL SYSTEM



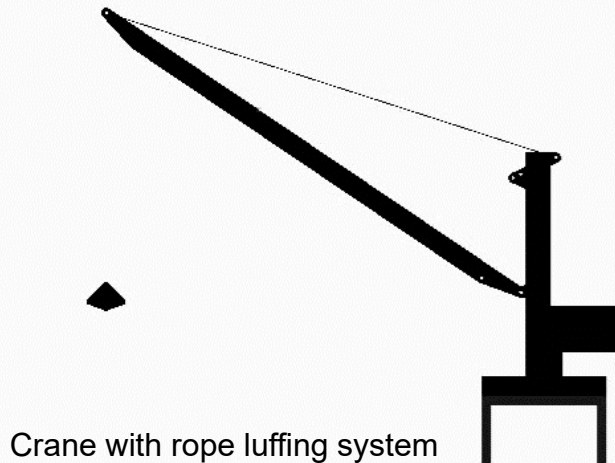
Horizontal load way with rope compensation  
on the crane with rope luffing system



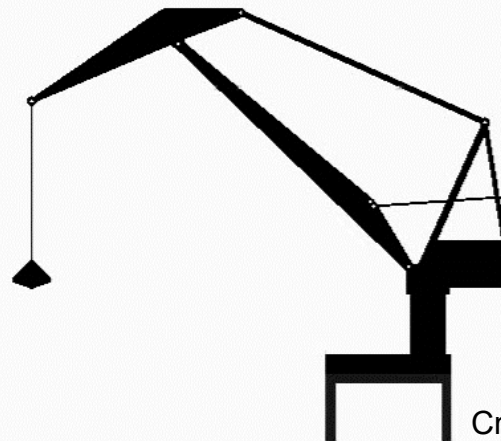
# HIGHLY EFFICIENT MECHANICAL SYSTEM



Horizontal load way with rope compensation  
on the crane with rope luffing system



Crane with rope luffing system



Crane with articulated jib system

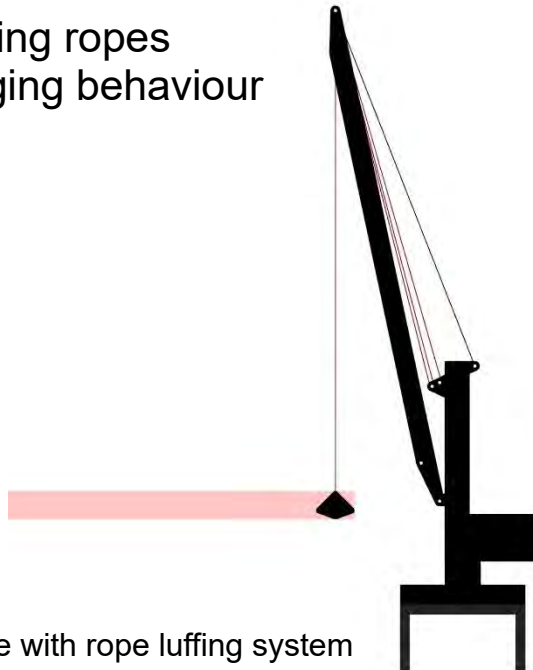
# HIGHLY EFFICIENT MECHANICAL SYSTEM



## Comparison of the load way

### With rope compensation

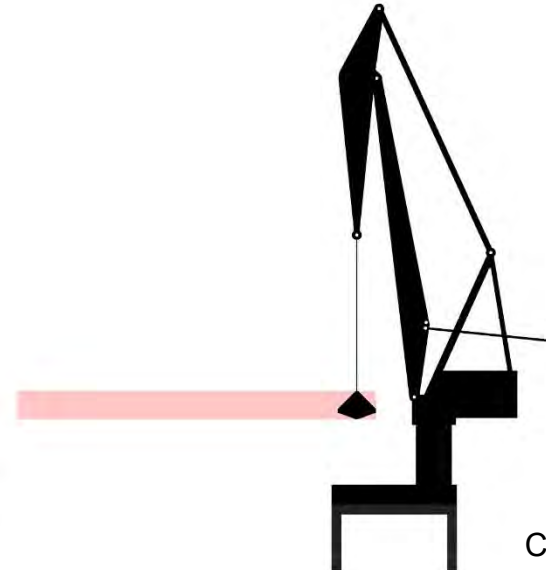
- Longer hoisting ropes
- strong springing behaviour
- higher costs



Crane with rope luffing system

### Short rope lengths

- lower costs

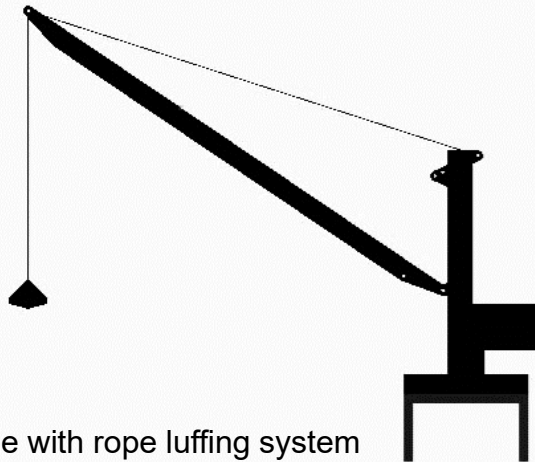


Crane with articulated jib system

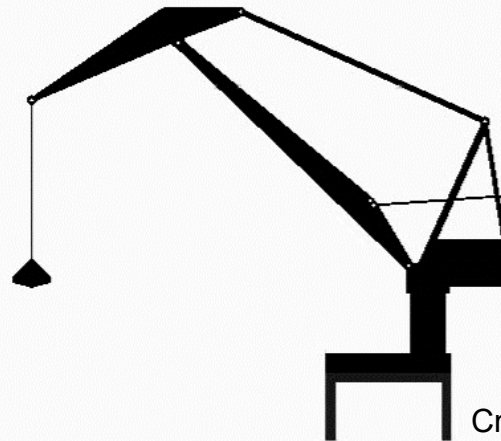
# HIGHLY EFFICIENT MECHANICAL SYSTEM



Comparison of the swinging way



Crane with rope luffing system



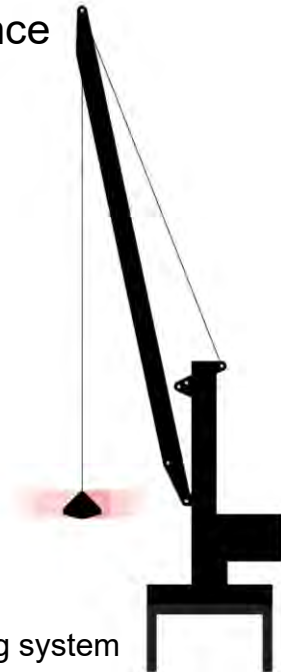
Crane with articulated jib system

# HIGHLY EFFICIENT MECHANICAL SYSTEM



Longer hoisting rope lengths

- wider swinging deflections
- longer handling cycle time
- lower handling performance



Crane with rope luffing system

Shorter swinging length

- smaller swinging deflections
- shorter handling cycle time
- higher handling performance



Crane with articulated jib system

# PERFECT LOGISTICS

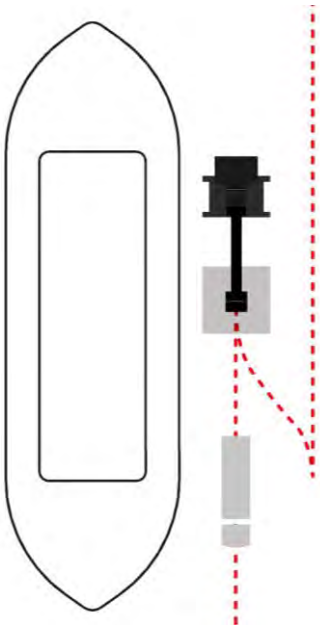


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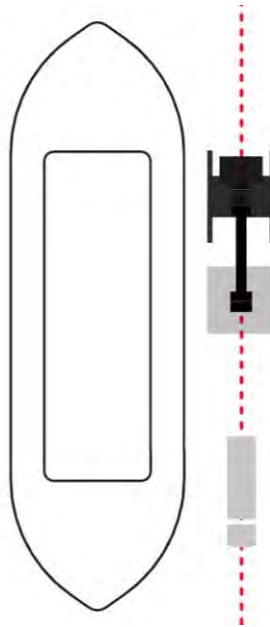
# PERFECT LOGISTICS



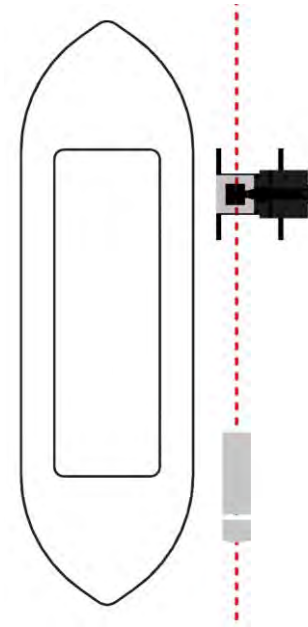
Crane with rope luffing system without high gantry



Crane with rope luffing system with high gantry



Crane with articulated luffing jib system with high gantry

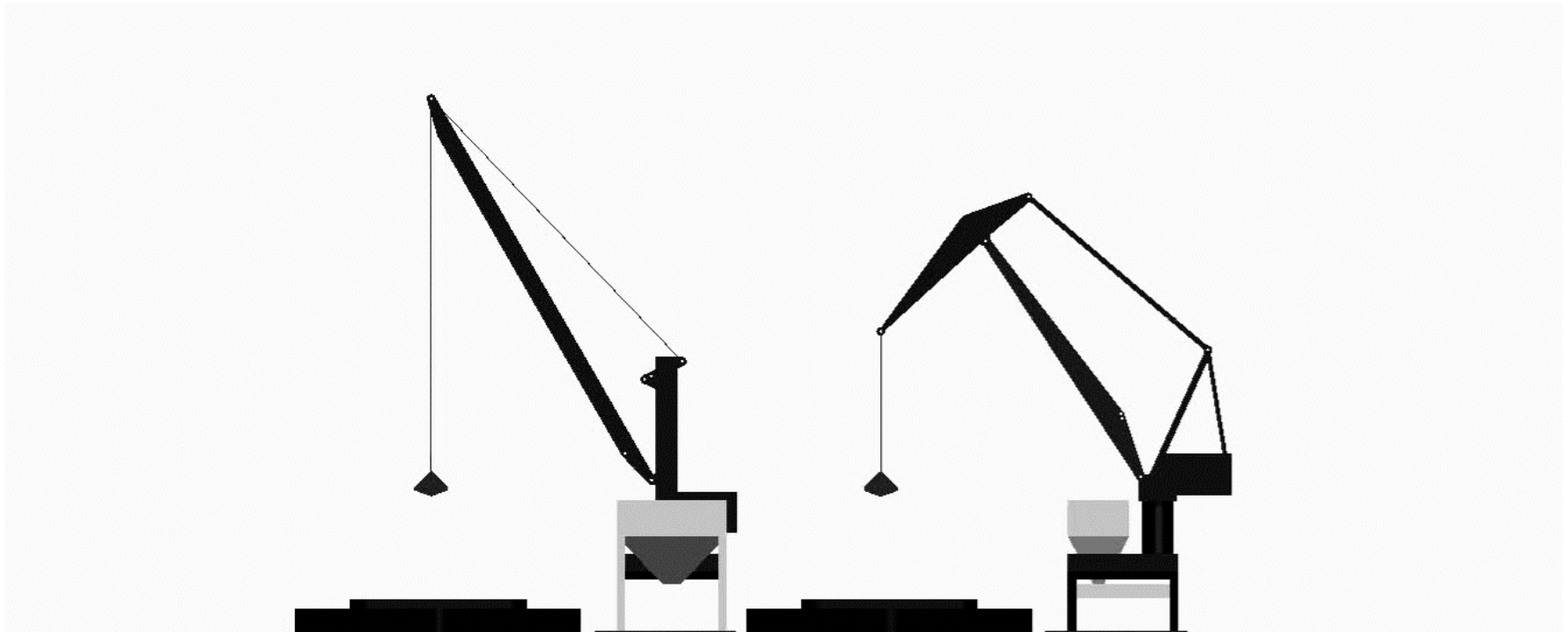




# PERFECT LOGISTICS



## Comparison of unloading concepts

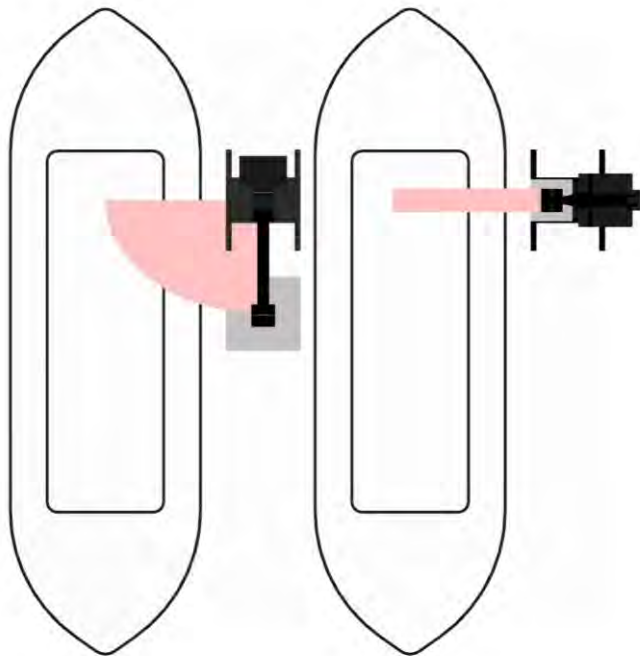


Crane with rope luffing system

Crane with articulated luffing jib system

# PERFECT LOGISTICS

## Comparison of unloading concepts



Rope luffing system    Articulated luffing jib system

### Tukan Kangaroo

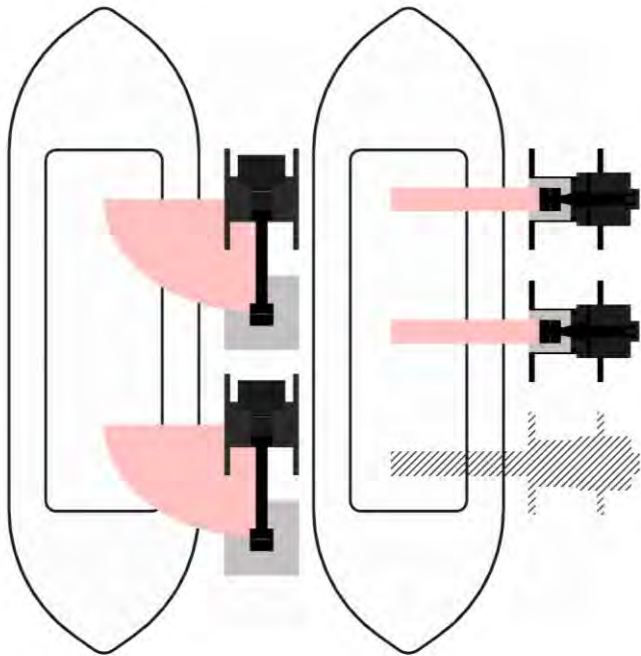
No slewing motion

→ shorter load ways

→ more working cycles

# PERFECT LOGISTICS

The hopper



Rope luffing system    Articulated luffing jib system

## Tukan Kangaroo

Integrated hopper - better access to the hatches

- less required space on the quay
- simultaneous operation of several cranes

# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION



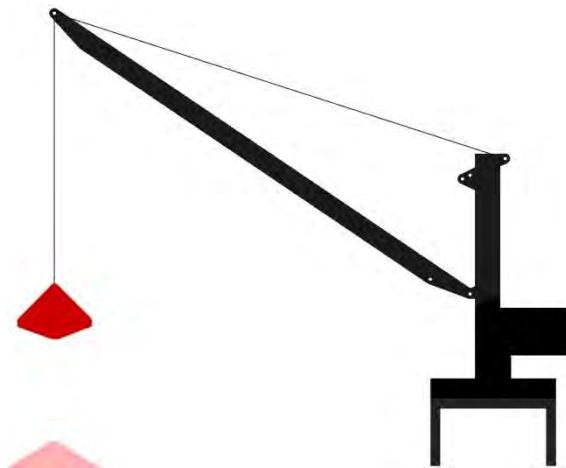
# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION



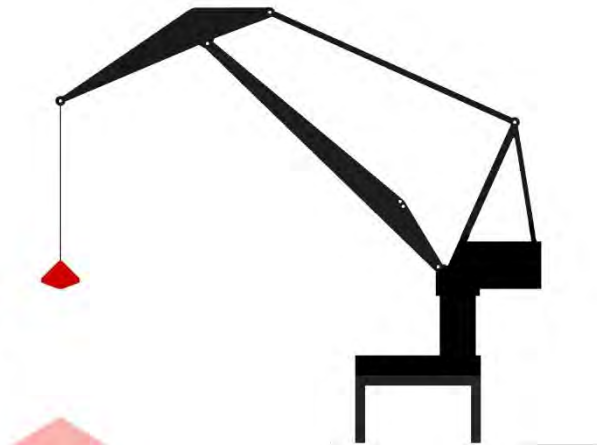
Comparison of grab size for the same quantity of material handled

Achievement of handling performances:

- smaller grabs can be used
- smaller grabs → lower deadload
- reduction of investments and operating costs



Crane with rope luffing system

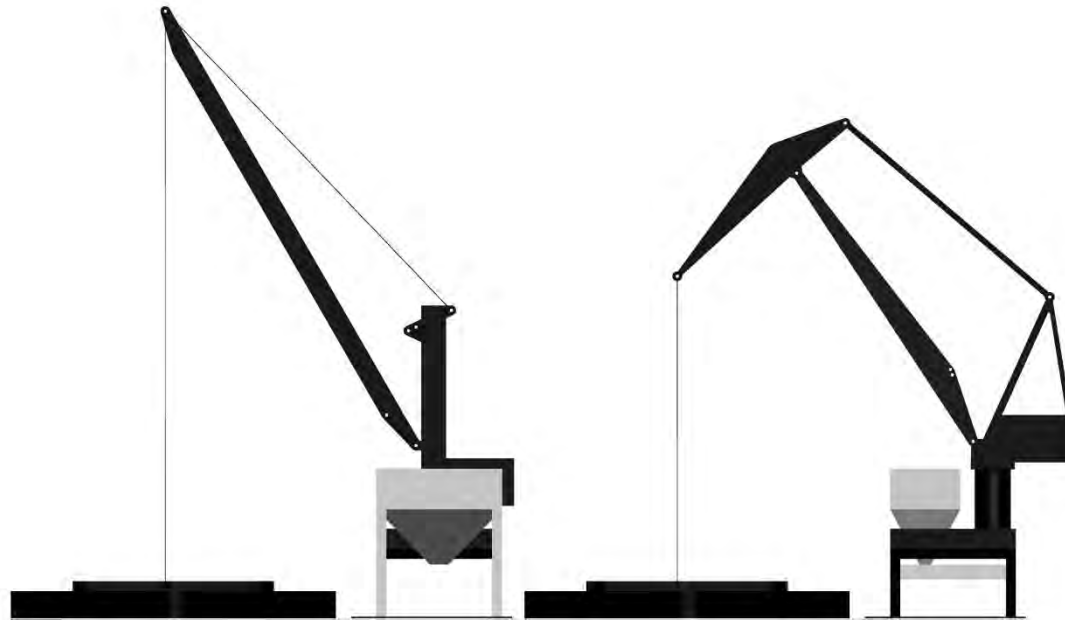


Crane with articulated luffing jib system

# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION



Comparison of swinging of the grab



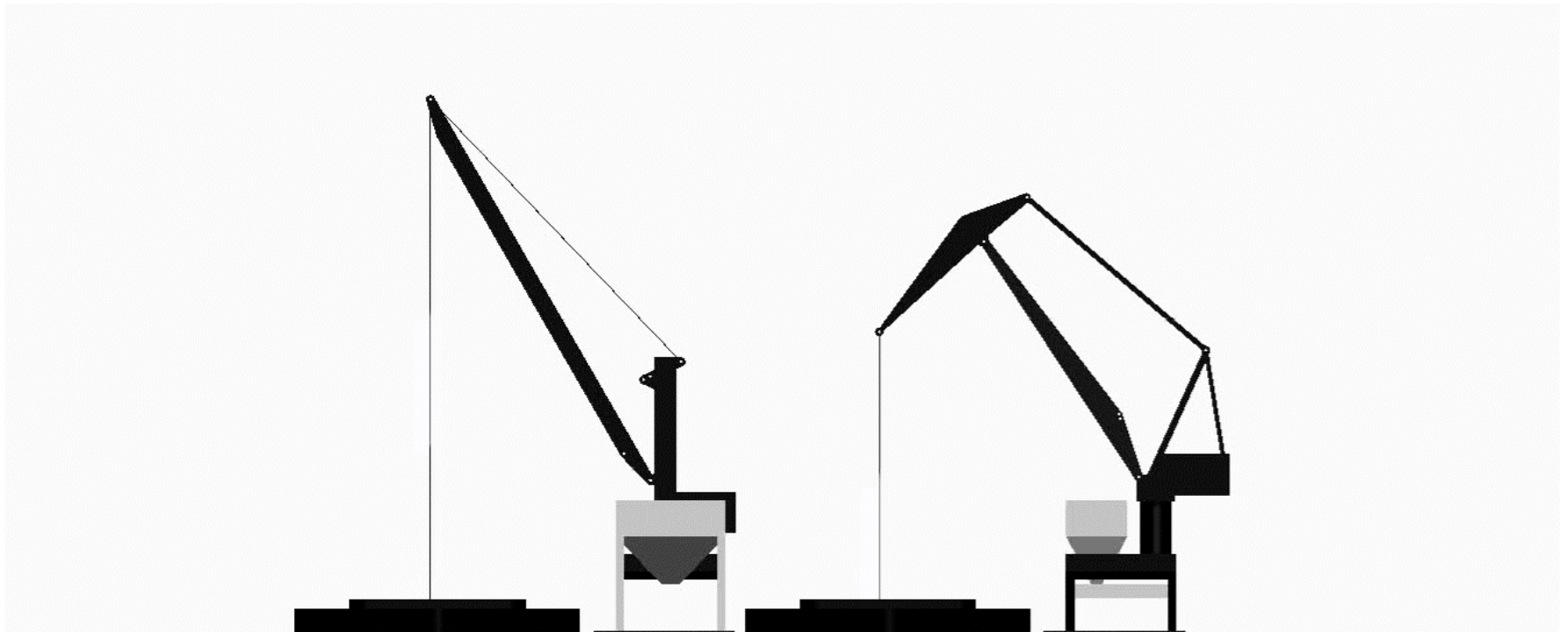
Crane with rope luffing system

Crane with articulated luffing jib system

# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION



Comparison of swinging of the grab



Crane with rope luffing system

Crane with articulated luffing jib system

# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION

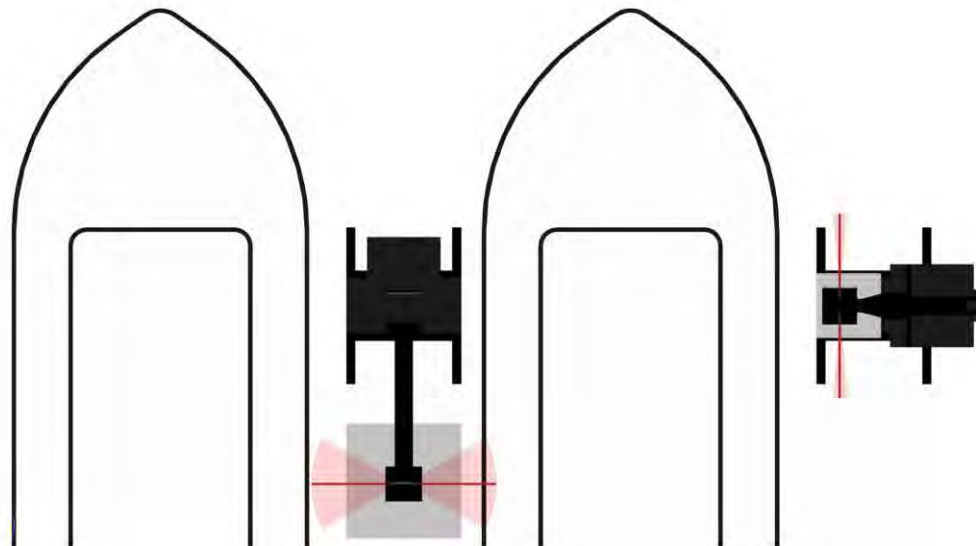


Comparison of swinging of the grab

Short swinging lengths  $\approx$  stable rope field

→ low turning and swinging motion of the grab

→ basic linear grab motion  $\approx$  no angular momentum



Crane with rope luffing system

Crane with articulated luffing jib system



# THE CRANE FOR THE CRANE OPERATOR – OPTIMISED FOR OPERATION

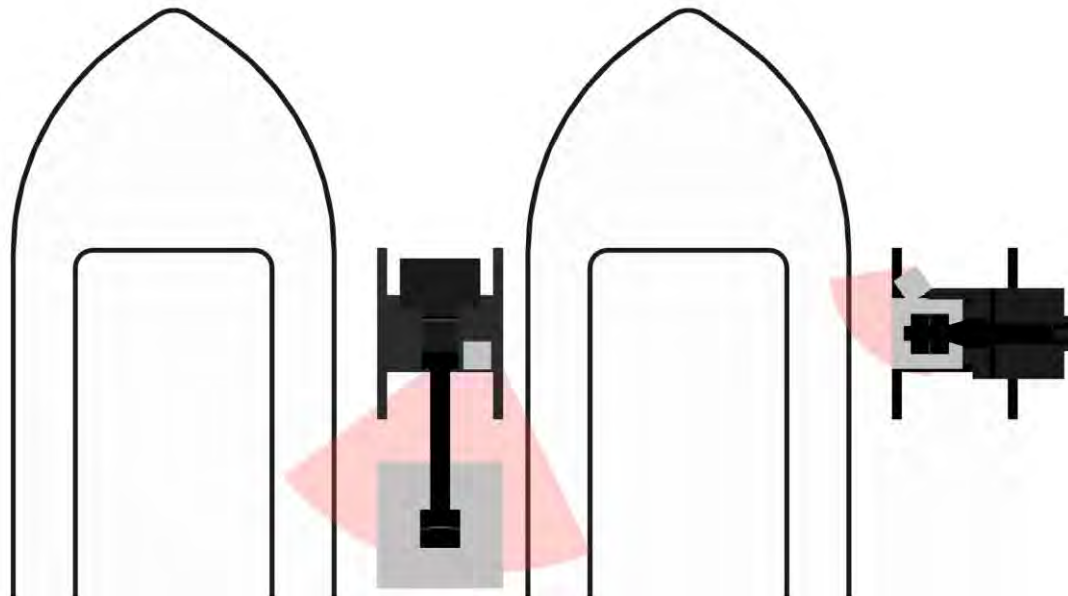


Comparison of operator's visibility conditions

Optimum cabin arrangement near the hopper

→ sphere of action and bulk hopper are always in the crane operator's field of view

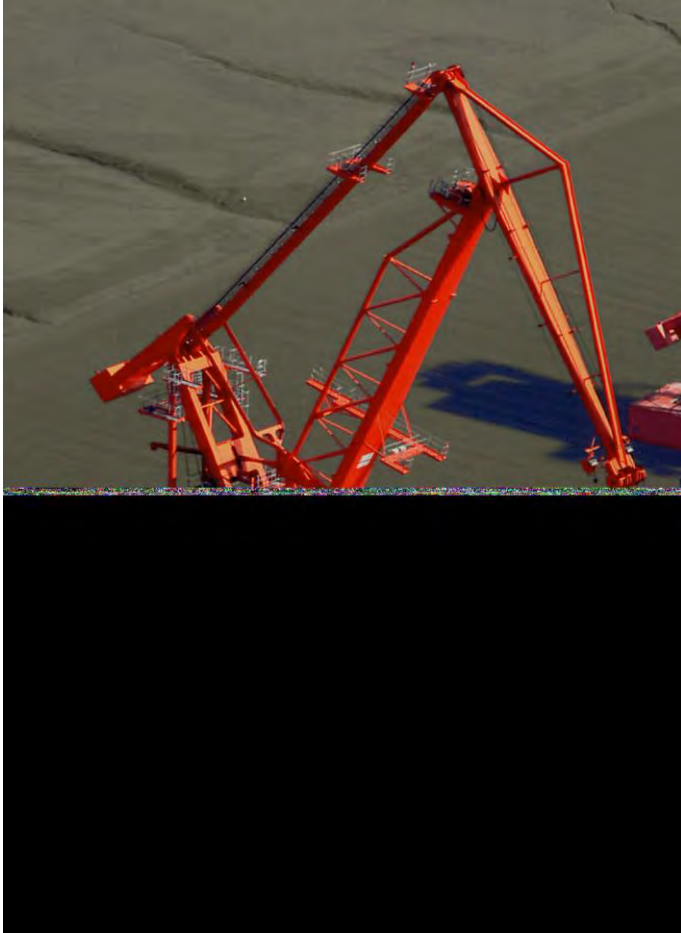
→ optimum visibility onto the hopper



Crane with rope luffing system

Crane with articulated luffing jib system

# TUKAN-K | THE SPECIALIST FOR HANDLING BULK MATERIAL



- Double jib principle
  - Fully electric drives
  - Dead weight compensation
- 
- ➔ low operating & maintenance costs
  - ➔ high level of labour productivity
  - ➔ long service life

„An efficient green solution for a clean environment“

THANK YOU  
FOR YOUR ATTENTION



KIROW, ARDELT AND KOCKS ARE MEMBERS OF KRANUNION.