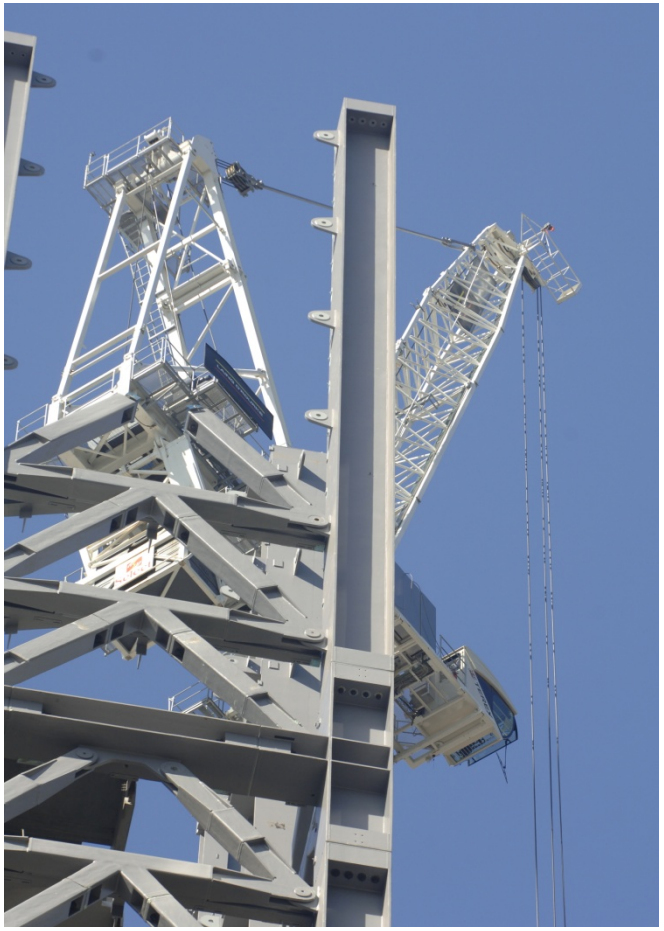
The difference between European and Japanese luffing jib tower crane designs **presented by** ***Heinz-Gert Kessel***

European high rise construction



heavy steel erection

concrete construction

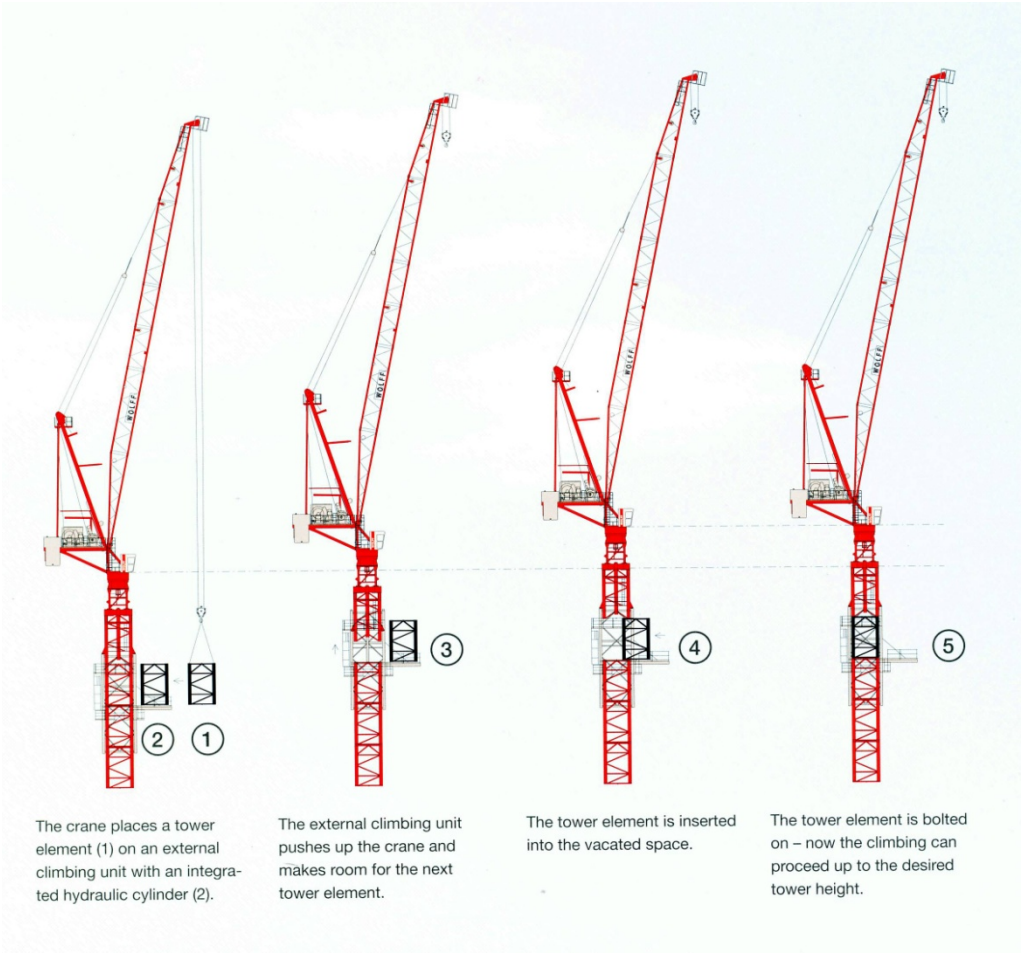
Japanese high rise construction

classic rigid steel framework

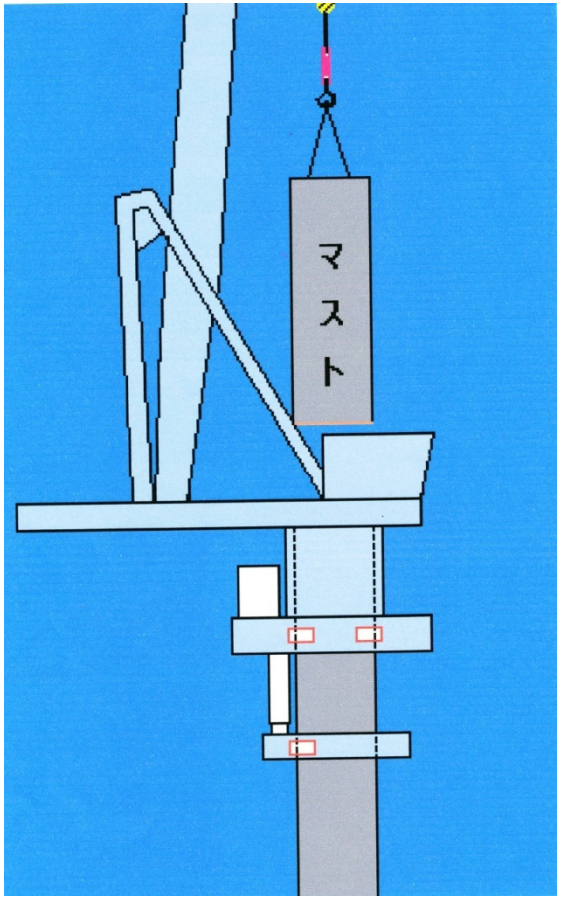
PCaPC method

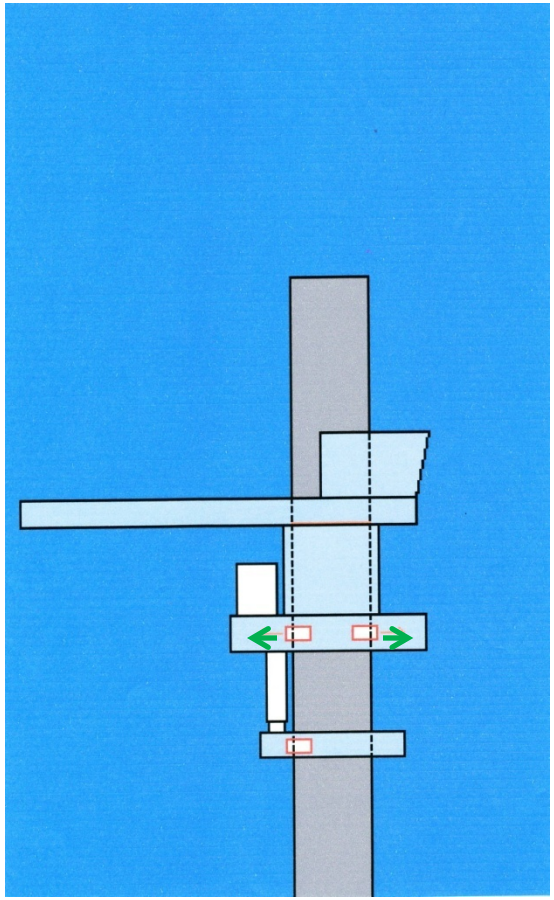
European-designed external climbing system

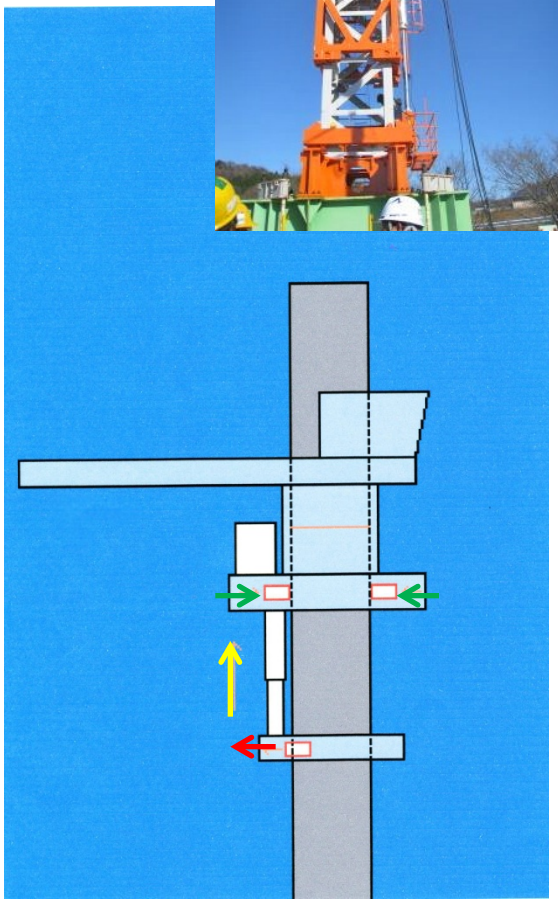
example **Wolff** 700B



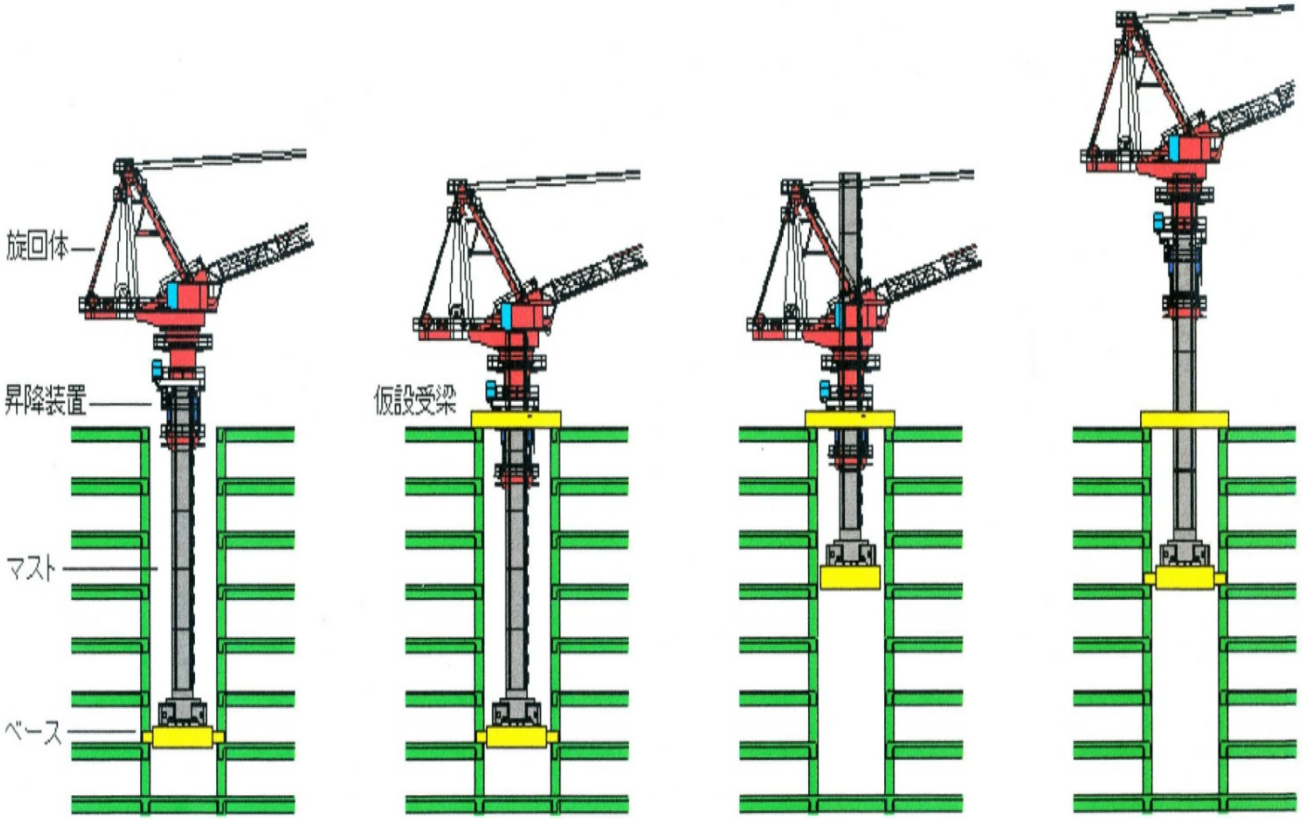
Japanese-designed external climbing system







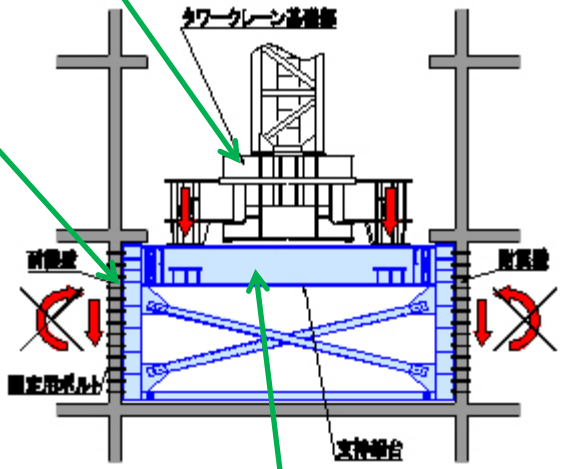
Japanese fast internal climbing



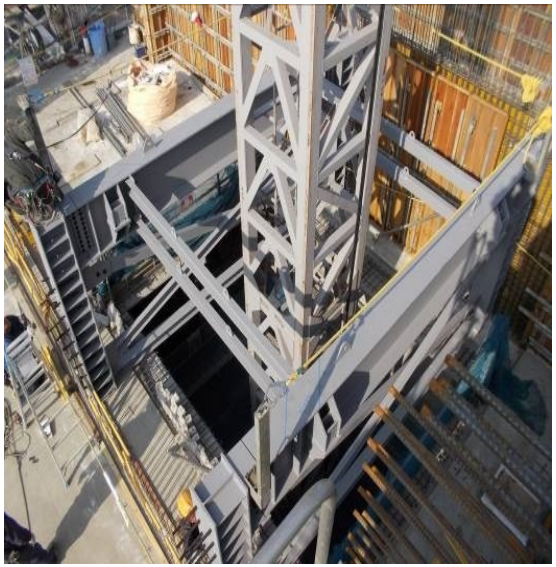
Special Japanese climbing frame for RC construction

standard crane base

wall anchor screws



customized frame



Japanese crane bases

example **IHI**

external crane base

foldable crane base cross

swing away crane base

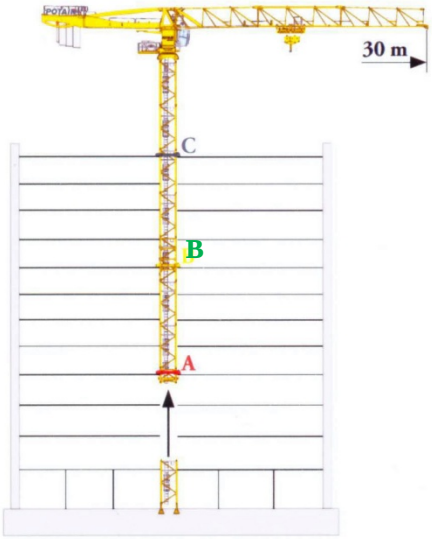
Yoshinaga telescopic tower crane climbing frame

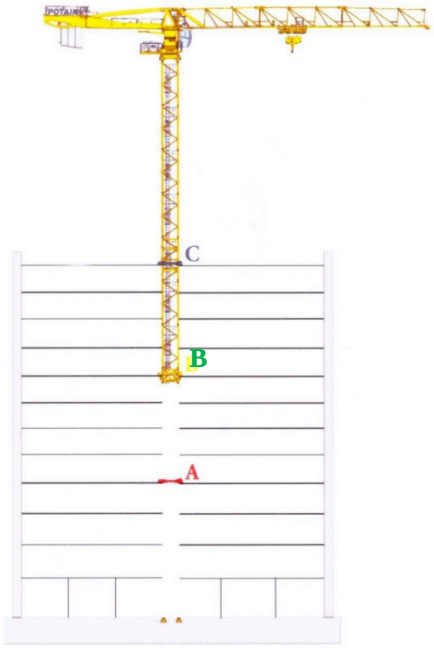
extracted outriggers

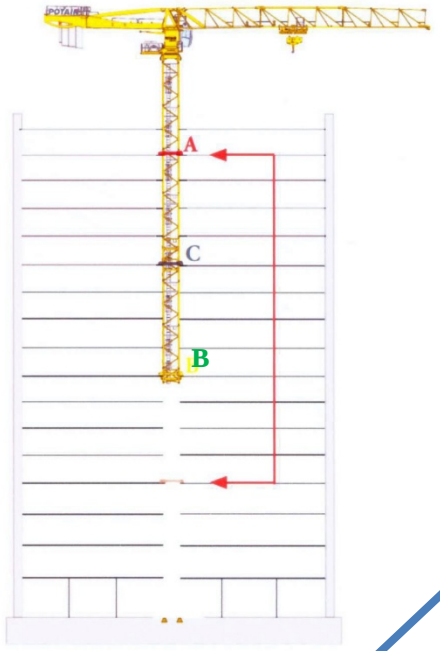
retracted outriggers during climbing

European internal climbing scheme

example **Potain**





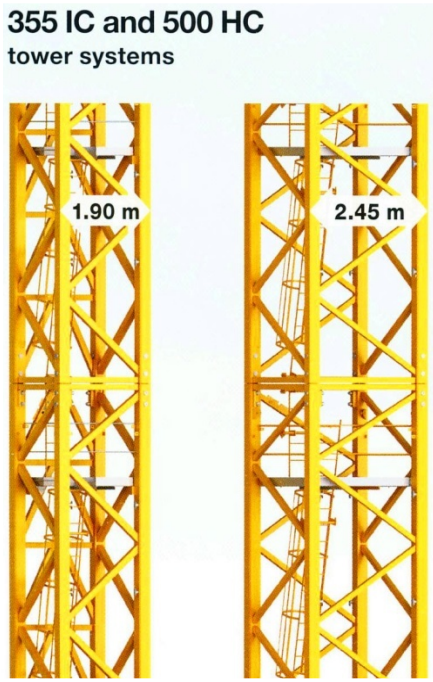


reinforced mast section

basic mast section

European modular tower system

example **Liebherr**



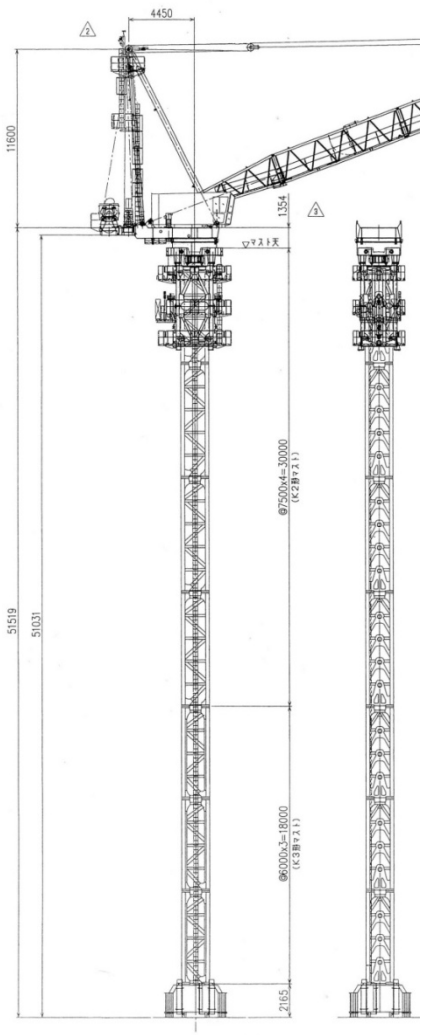
355 IC tower system

- Just 1.9 x 1.9 m outer dimensions
- Climbing in buildings even in narrow elevator shafts
- Climbing on the side of buildings
- Durable taper pin connection, entirely free from play
- Transport in a container (40')

500 HC tower system

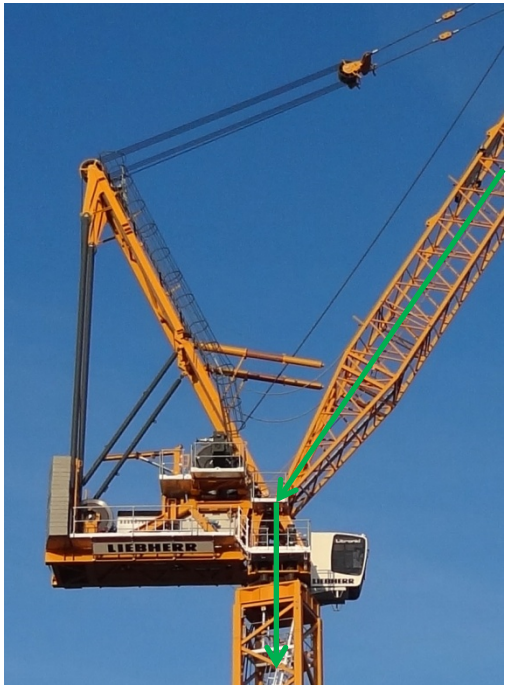
- 2.45 x 2.45 m outer dimensions
- Suitable for extremely high tower configuration heights
- Versatile, modular combinations with other Liebherr tower systems
- Durable taper pin connection, entirely free from play
- Transport in a container frame

Japanese tower system



example **IHI**

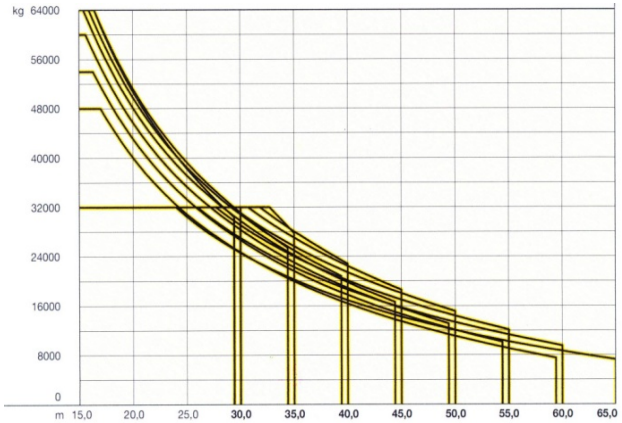
Different kind of jib foot connection placement



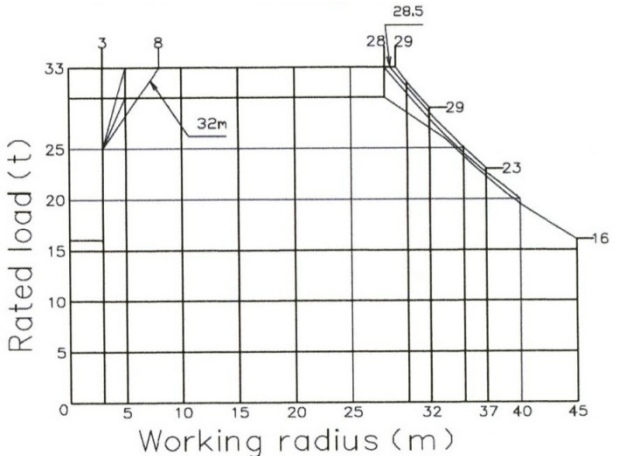
Liebherr 710HC-L

Kitagawa JCL1000NK

Liebherr 710HC-L



Kitagawa JCL1000NK



Different kind of machinery deck design

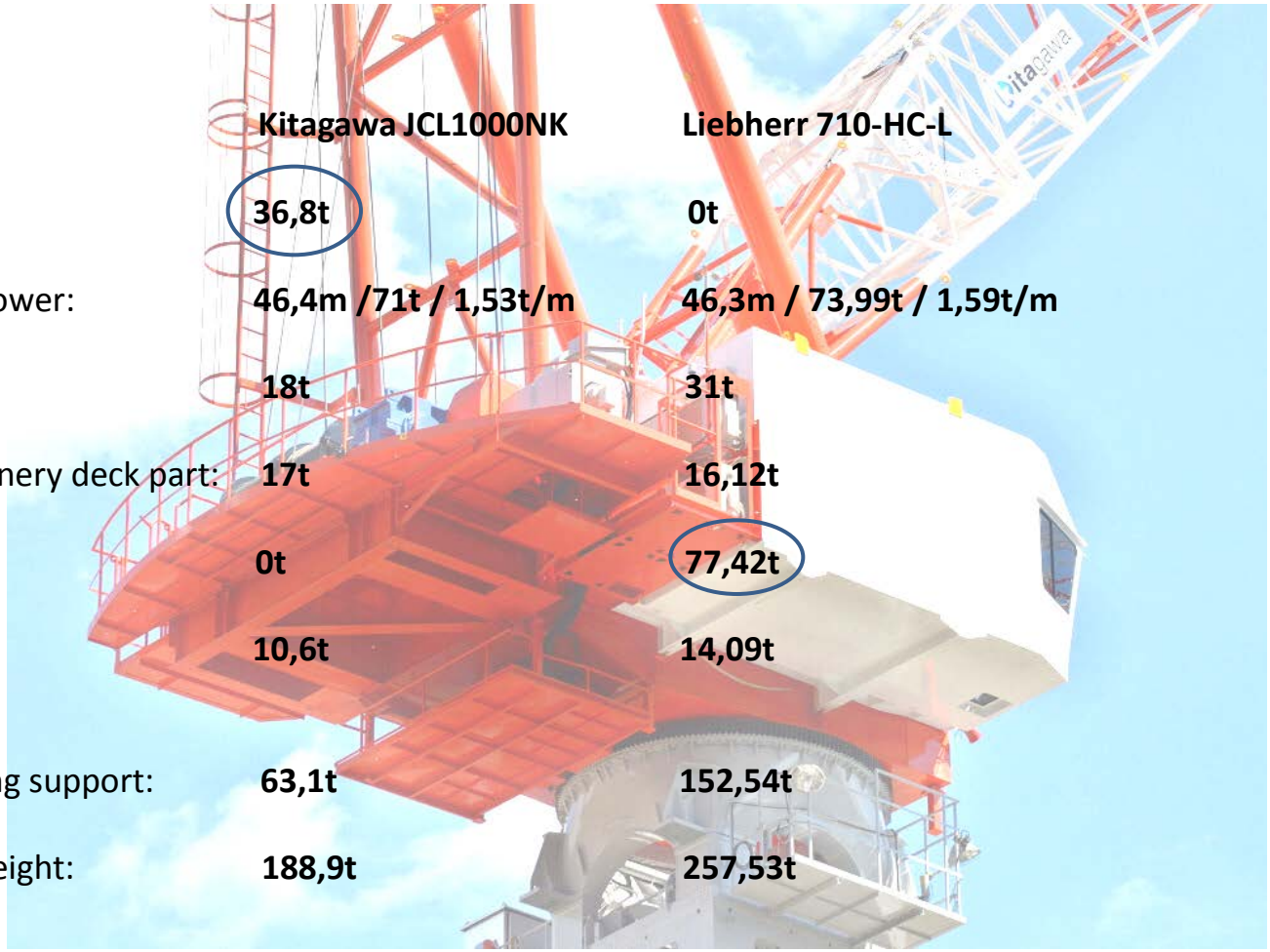
Liebherr 710HC-L

- containerized modules
- double deck design
- concrete or steel ballast

Kitagawa JCL1000NK

- functional roadable modules
- short and wide deck design
- no ballast

Comparison of the crane component weights

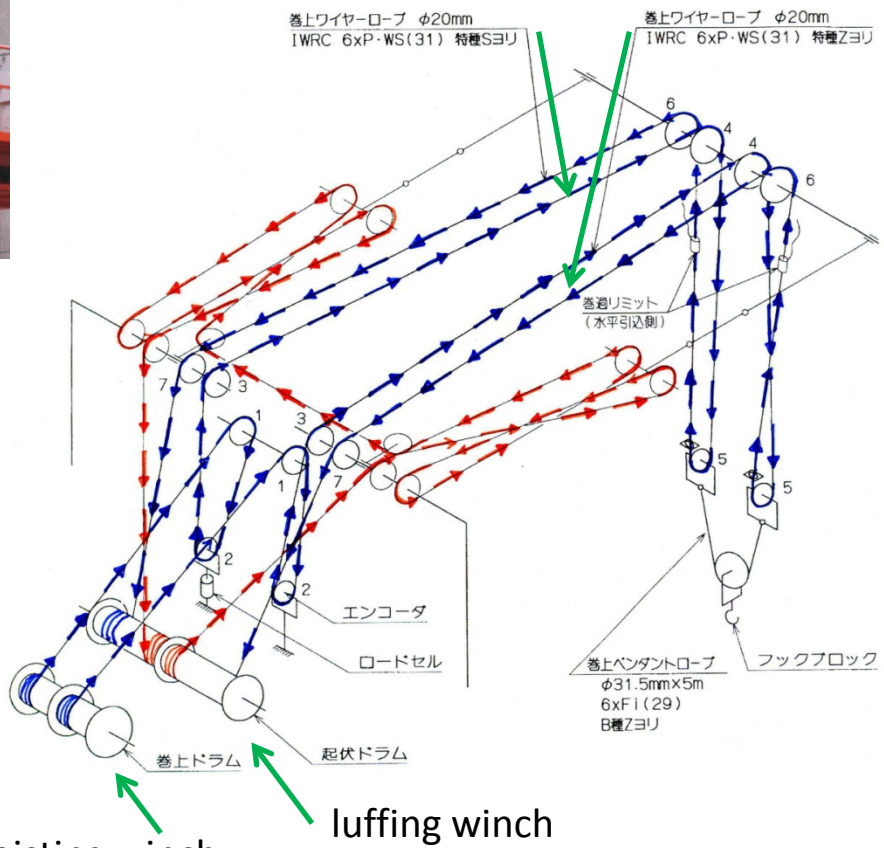


crane type:	**Kitagawa JCL1000NK**	**Liebherr 710-HC-L**
crane base:	**36,8t**	**0t**
free standing tower:	**46,4m /71t / 1,53t/m**	**46,3m / 73,99t / 1,59t/m**
climbing unit:	**18t**	**31t**
heaviest machinery deck part:	**17t**	**16,12t**
ballast:	**0t**	**77,42t**
45m jib:	**10,6t**	**14,09t**
upper crane incl. slewing ring support:	**63,1t**	**152,54t**
whole crane weight:	**188,9t**	**257,53t**

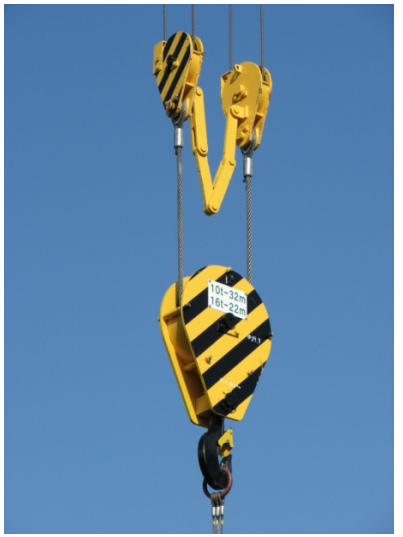
Typical Japanese way of rope reeving

example **KITAGAWA**

S-laid hoisting rope Z-laid hoisting rope



hoisting winch luffing winch

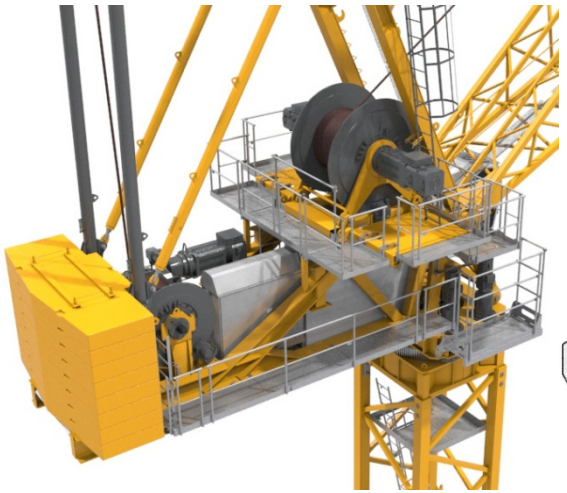


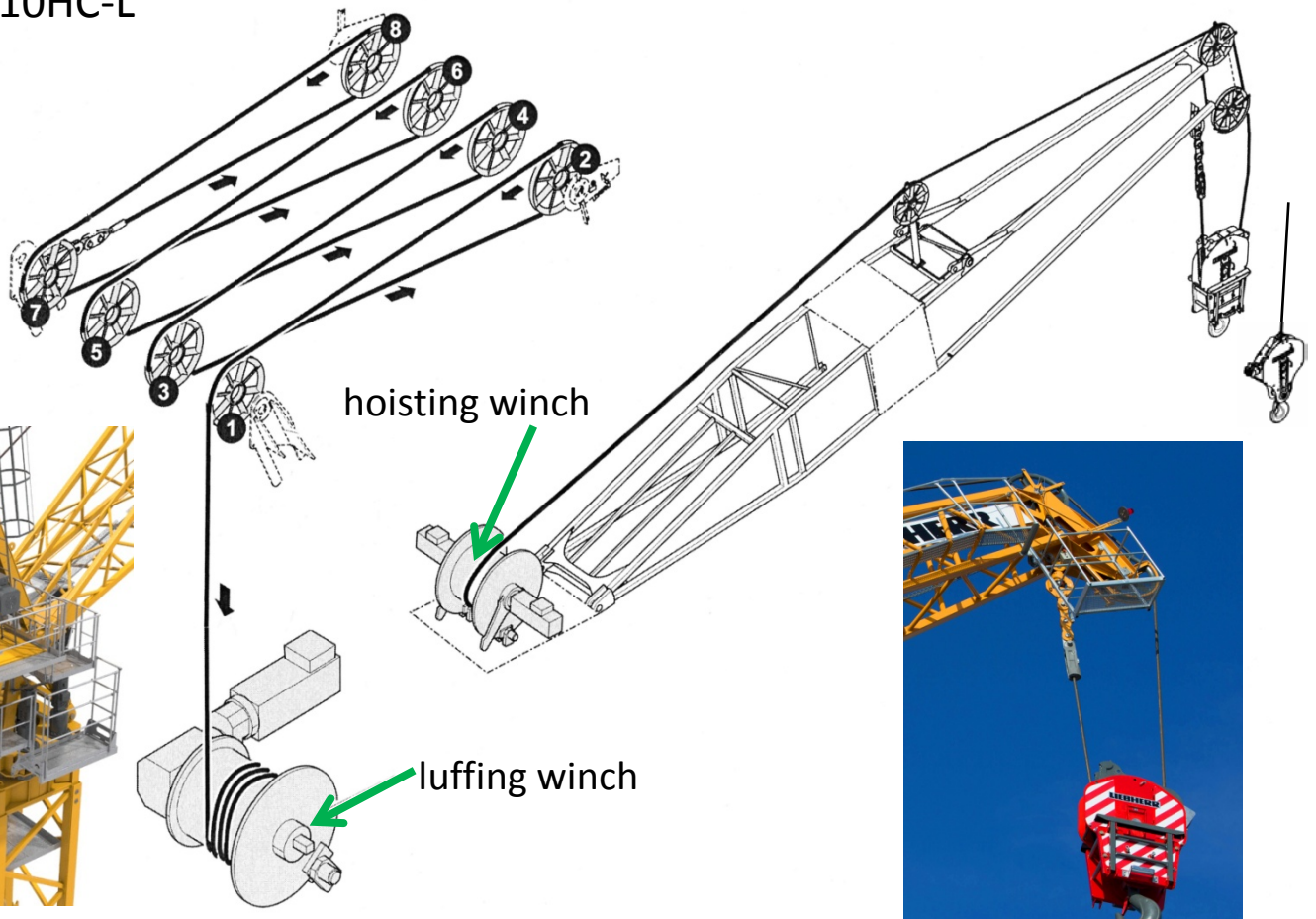
Japanese luffing rope installation

complex rope reeving with jib held in position by assistant crane

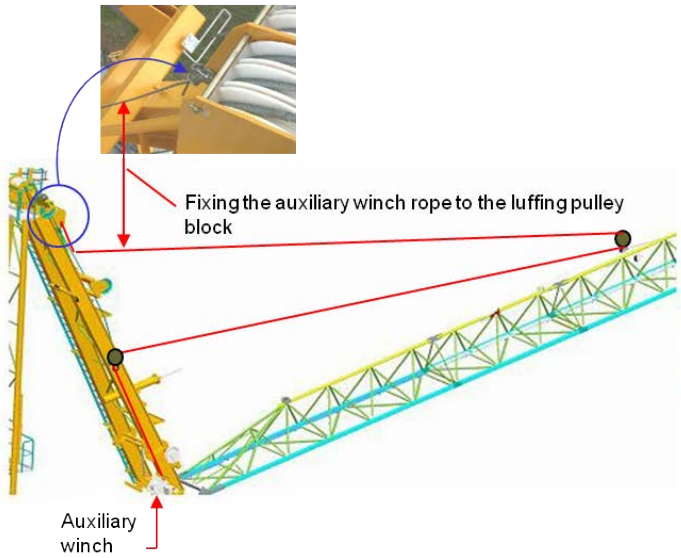
Typical European way of rope reeving

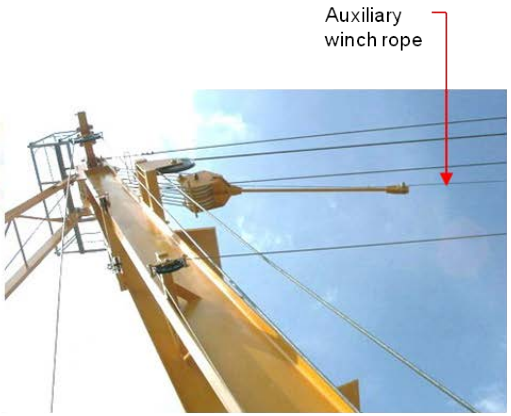
example **Liebherr** 710HC-L



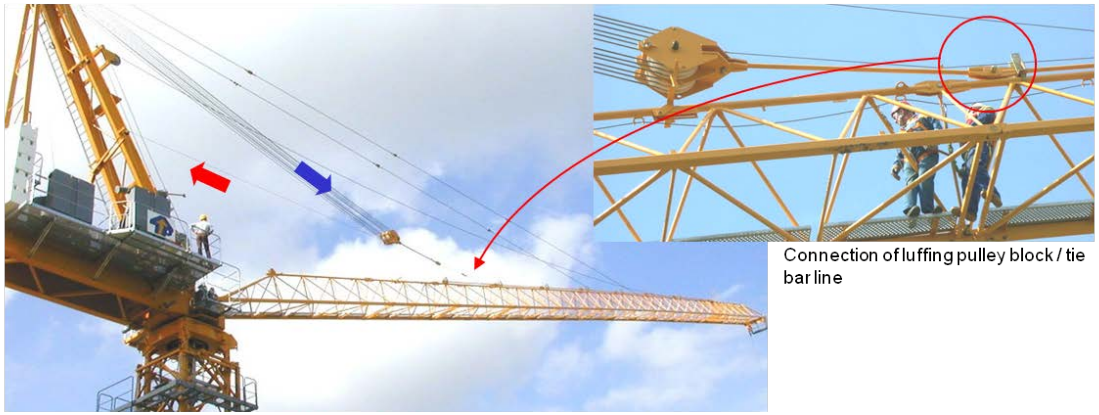


Potain way of luffing rope installation





Lowering the luffing pulley block

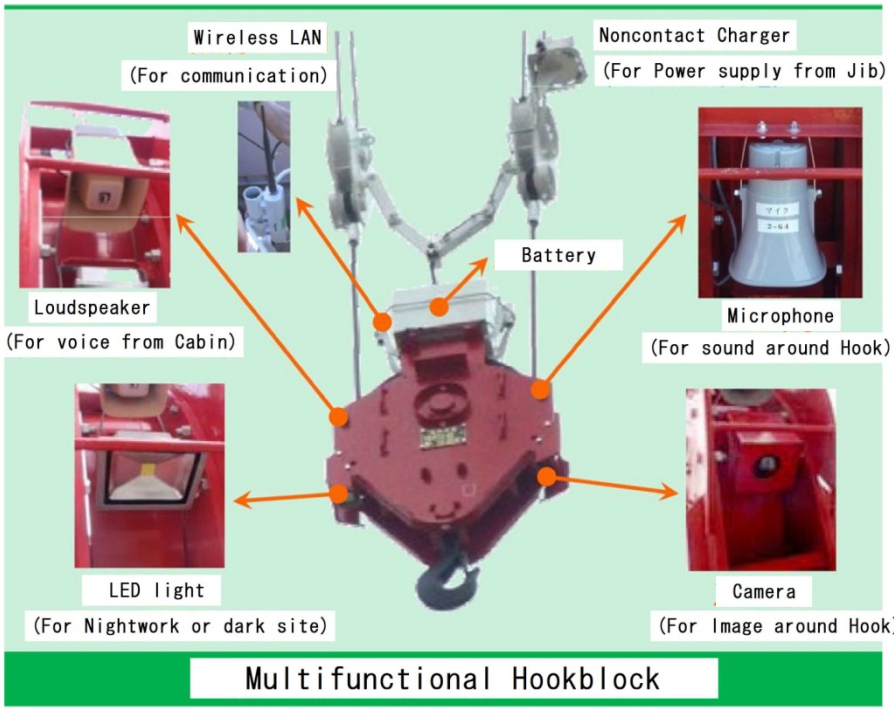

Connection of luffing pulley block / tie bar line

Simultaneous use of the auxiliary winch and the luffing winch

- retaining slings holding the jib, no assistant crane requested
- connecting the luffing rope pully block to the jib tier bar line by auxiliary winch

Japanese smart crane concept

hook-camera / anti-collision system/ load-tracking



www.shimz.co.jp/news_release/2013

Japanese tower cranes are **unique** in the world.

- earthquake- and typhoon-proof customized design
- adapted to steel and PCaPC building construction
- fast and flexible internal climbing system
- system integrated external climbing safety
- smart crane concept with monitoring tools to reduce construction time

Thank you very much for your attention