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
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

• retaining slings holding the jib, no assistant crane requested

• connecting the luffing rope pulley block to the jib tier bar line by auxiliary winch

Simultaneous use of the auxiliary winch and the luffing winch

Fixing the auxiliary winch rope to the luffing pulley block

Lowering the luffing pulley block

Connection of luffing pulley block/tie bar line

Auxiliary winch rope
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

Any Questions?