

...e-chainsystems®...e-chains®...readychain®...chainflex® cables for...

# e-chainsystems® for cranes & Heavy Duty applications



...iglidur®.igubal®.drylin®.xiros®...plastics for longer life®

# igus<sup>®</sup> - Headquarter, Cologne Germany

33 igus subsidiaries world wide (and more to come)  
More than 52 certified igus distributors around the world





# igus® (India) Pvt. Ltd, Bangalore

## New igus India office building and factory

### 80 employees in departments:

- ▶ E-ChainSystems®,
- ▶ Bearings,
- ▶ Cranes & Projects,
- ▶ ReadyChain® & harnessing



### More than 35 employees:

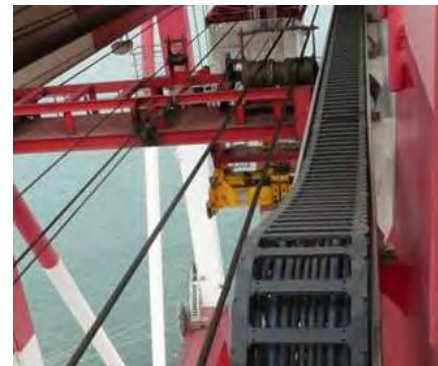
- ▶ Outside sales & customer support incl project department



...e-chainsystems® ...e-chains® ...readychain® ...chainflex® cables for...

# igus® e-chainsystems®

What are the **igus®** benefits for crane and heavy duty applications?





# igus® mobile cable systems for cranes

What can igus® do better?



**Motor reel**



**Cable tender**



**Festoon**



**BusBar-Systems**

# igus® mobile cable systems for cranes

What can igus® do better?

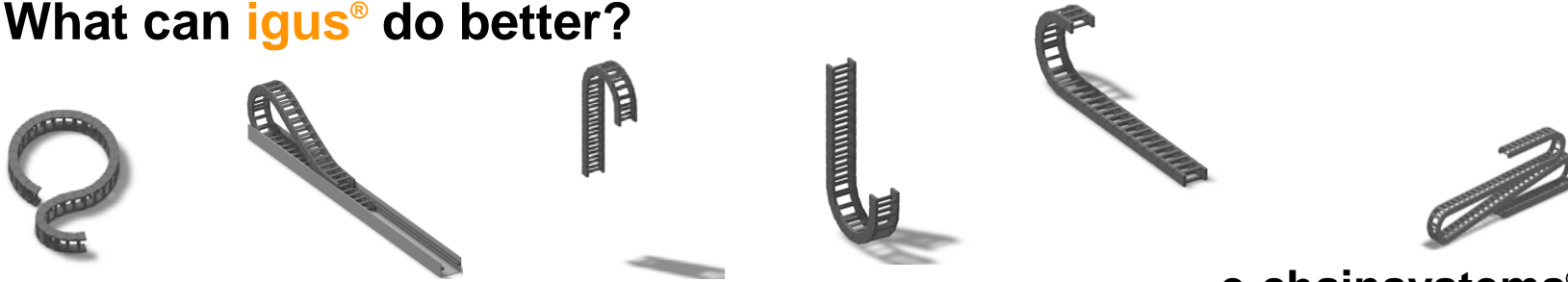
igus® replaces those “old fashioned“ systems into ...





# igus® mobile cable systems for

What can igus® do better?



... into a modern turnkey **e-chainsystem®**

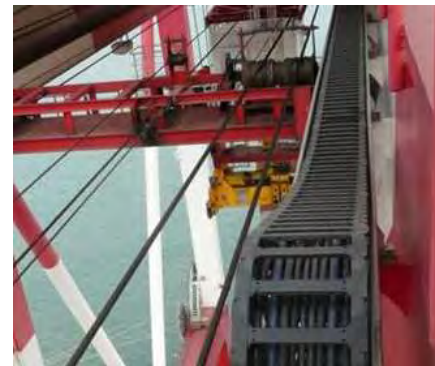
**e-chainsystems®**  
completely delivered  
with chainflex® cables  
(readychain® system)



...e-chainsystems® ...e-chains® ...readychain® ...chainflex® cables for...

# igus® e-chainsystems®

## Benefits for machinery builder and end user



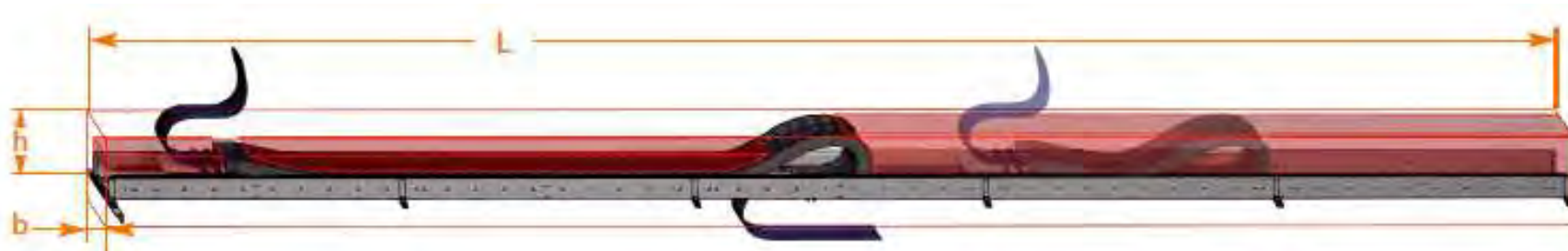


# igus<sup>®</sup> - e-chain<sup>®</sup> benefits for crane builder & end user

- ▶ Space saving design
- ▶ No cable loop station & no additional steel structure for loop station



Required installation space for e-chainsystem<sup>®</sup>  $h = \text{approx. } 800 \text{ mm}$



# igus<sup>®</sup> - e-chain<sup>®</sup> benefits for crane builder & end user

- ▶ No additional drives or control system necessary to move the chain system
- ▶ Synchronous run of trolley and E-ChainSystem<sup>®</sup>
- ▶ All kind of media (power, data, hydraulics, pneumatics, ...) can be conveyed in one system
- ▶ Quick an easy installation of additional cables or hoses
- ▶ igus<sup>®</sup> field service (inspection, installation, supervisor service)



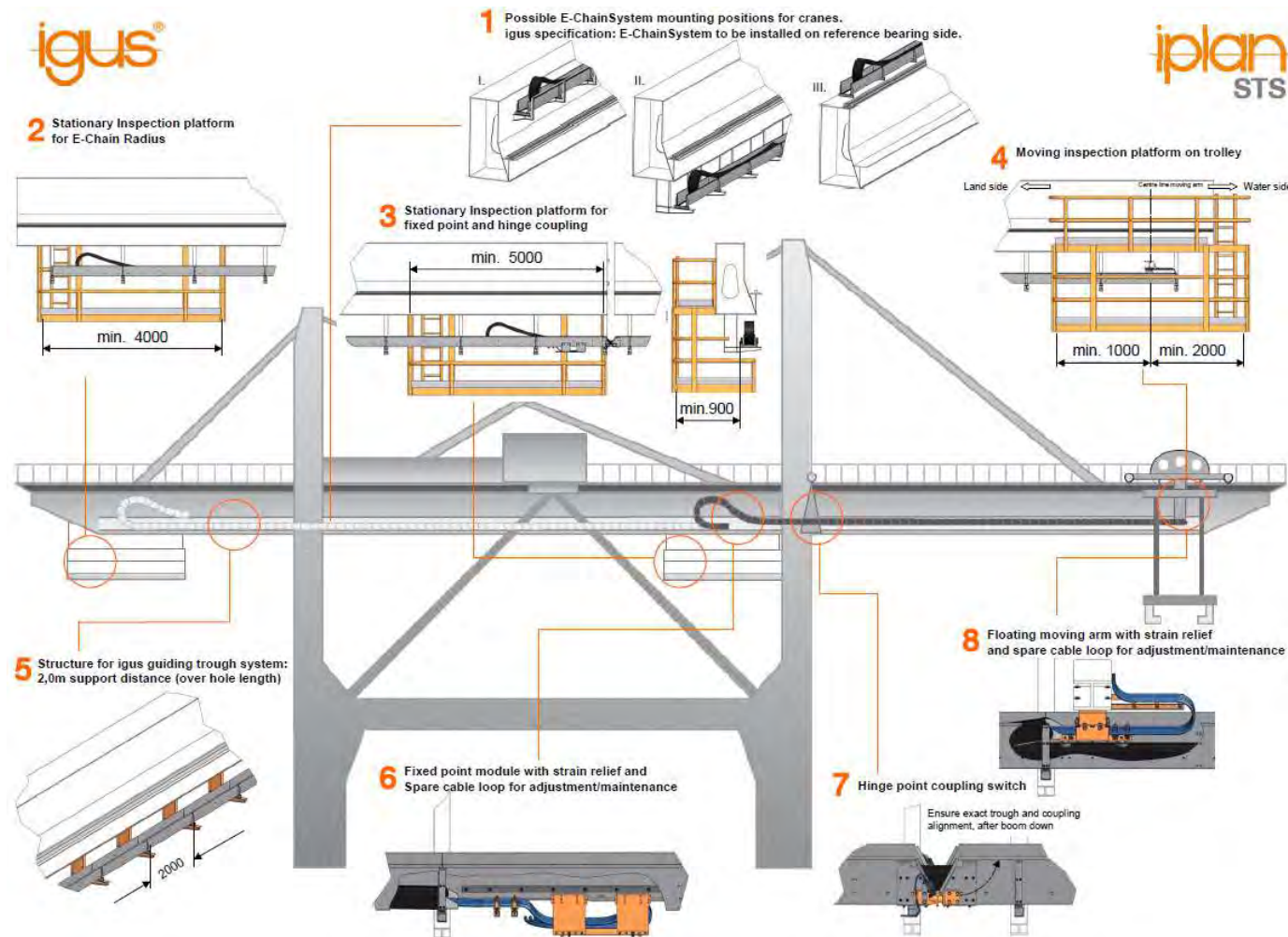
e-chains<sup>®</sup> /  
installation  
/service./....





# igus<sup>®</sup> - e-chain<sup>®</sup> benefits for crane builder & end user

- ▶ Low maintenance extravagance will reduce the crane downtimes
- ▶ Wind an weather resistant system
- ▶ Spare part guarantee for 10 years and more



# igus<sup>®</sup> - e-chain<sup>®</sup> technical limitations



- ▶ **Speed up to 600m/min**

The fastest crane with igus<sup>®</sup> E-Chain<sup>®</sup> is running at 300m/min

- ▶ **Acceleration up to 10m/s<sup>2</sup>**

- ▶ **Travel length up to 900m**

The longest crane application running with igus<sup>®</sup> E-Chain<sup>®</sup> is 500 m long (STS, Port of Singapore, since 2002)

The longest igus<sup>®</sup> E-chain<sup>®</sup> application is 615m

- ▶ **No limit to cable load**

- ▶ **Possible to use hydraulic-, pneumatic- and water hoses**

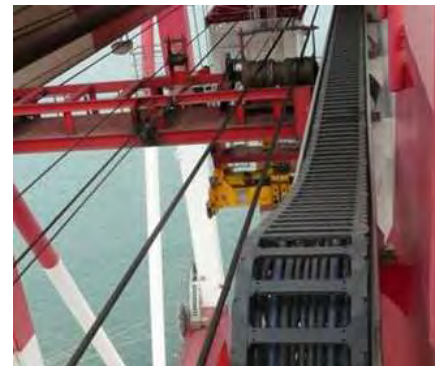
- ▶ **Possible to use 6/10kV power-cables**



...e-chainsystems® ...e-chains® ...readychain® ...chainflex® cables for...

# igus® e-chainsystems®

## Crane components & services



# igus® - Crane components & services

## e-chain® series E4/4



- ▶ Rugged stop dog design
- ▶ Outer link with rear catch for high stability
- ▶ High torsion rigidity
- ▶ Wide, cable friendly plastic crossbars
- ▶ Large interior separation kit

Successfully used in various port applications since 1995!





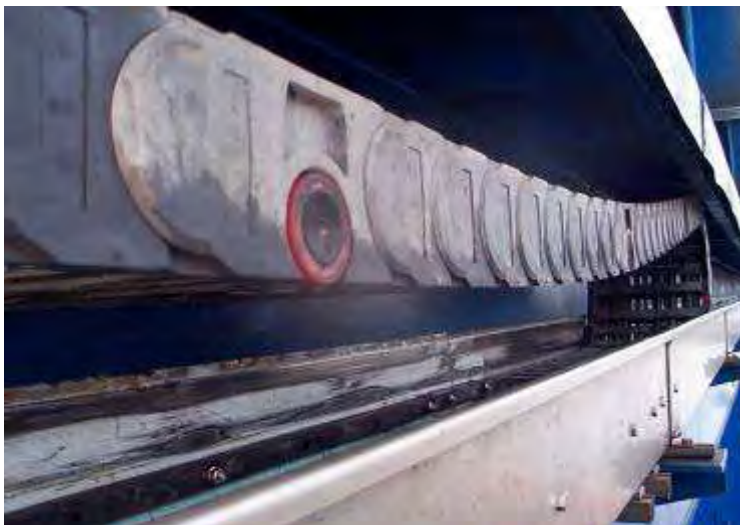
# igus® - Crane components & services

## rol-e-chain® series E4/4



- ▶ Rolling instead of gliding – major reduction in driving power
- ▶ Rollers with stainless steel roller bearings as standard
- ▶ Consistent rolling resistance for applications in dirty environments
- ▶ Various roller types for optimum application adaption

Successfully used in various port applications since 1999!



# igus® - Crane components & services

## Heavy Duty rol-e-chain® series



- ▶ Larger pin / bore connection surface (Y)
- ▶ Enlarged gliding surface, less wear (X)
- ▶ Widened stop dog surface
- ▶ High tensile stability
- ▶ Robust steel mounting brackets

Successfully used in various port applications since 2004!



5050HD compared to classic 5050 series:  
Y: +120 %, X: +7,5 mm

4040HD compared to classic 4040 series:  
Y: +140 %, X: +9 mm

# igus® - Crane components & services

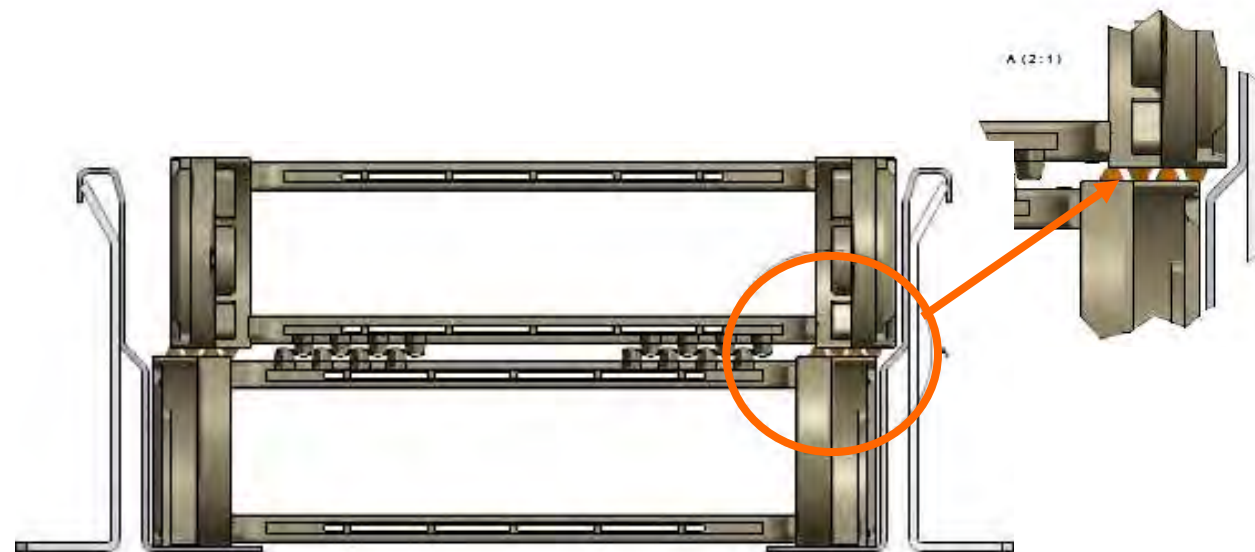
## e-chain® series P4



Successfully used in various port applications since 2008!



- ▶ Smooth, low noise operation through identical pitch length for links with and without rollers
- ▶ Integrated grooved roller, running on an even, plain surface
- ▶ Designed for large fill weights and high travel speeds
- ▶ Same material strength as the proven E4/4 Heavy Duty e-chains®





# igus® - Crane components & services

## Guide trough systems

Steel & Aluminum guide troughs for long travel applications



For heavy applications: heavy duty installation sets, with reinforced brackets and special installation profiles



# igus® - Crane components & services

## chainflex® cables



## Bus Cables

chainflex® bus cables are available for all continuous bus systems within e-chains®

## Fibre Optic & Coaxial Cables

Plastic (980/1000) or fibre glass (62.5/125 or 50/125), 1, 2, 6 or 12 fibres (they are all tested for several million cycles)

## Control Cables

PVC, PUR, TPE – A wide selection of materials for all applications - shielded and unshielded control cables with various combinations of cores and cross sections.

# igus® - Crane components & services

## chainflex® cables



### Motor & Servo Cables

Shielded servo cables for inverter operation up to 600/1000 V.  
Shielded & unshielded motor cables from 1,5 to 95mm<sup>2</sup>

### Single Core Motor Cables

Shielded & unshielded single core motor cables for most demanding requirements.

### Single Core CF Crane

Shielded, highly flexible single core for up to 6/10kV.  
Medium voltage cable for most demanding requirements in crane building.



# igus® - Crane components & services

## Test lab

- ▶ 1750m<sup>2</sup> test area
- ▶ More than 80 e-chain® & chainflex® tests running at a time
- ▶ Simulating real conditions (travels of up to 300m and speeds up to 300m/min)



Climatic tests for all e-chain® & chainflex® cables.  
Material tests from - 40°C up to +199°C.



chainflex® cables in life span test. Millions of cycles  
guarantee: chainflex® lasts or money back!



# igus® - Crane components & services

## readychain®



- ▶ The selected igus® chainflex® are inserted in the e-chain®
- ▶ The defined cable projecting lengths are marked and fixed
- ▶ Project-specific cable connections are mounted
- ▶ The complete readychain®-system is delivered on a special wooden drum



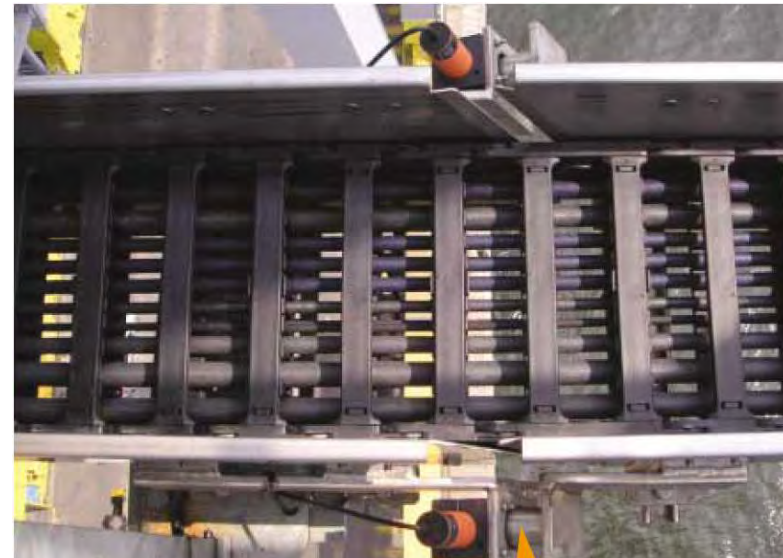


# igus® - Crane components & services

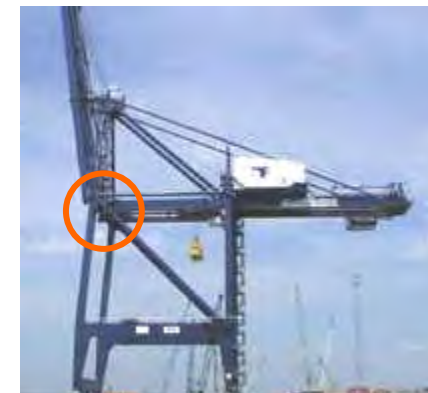
## Special part - hinge clutch



Hinge clutch at the hinge point with bolts and holes to get a safe adjustment after bringing down the boom



Hinge clutch at hinge point  
Incl. limit switch





# igus® - Crane components & services

Special part

## Floating moving arm



igus® floating moving arm for compensation of the lateral mismatch

## Strain relief



Clamps for safe cable strain relief

# igus® - Crane components & services

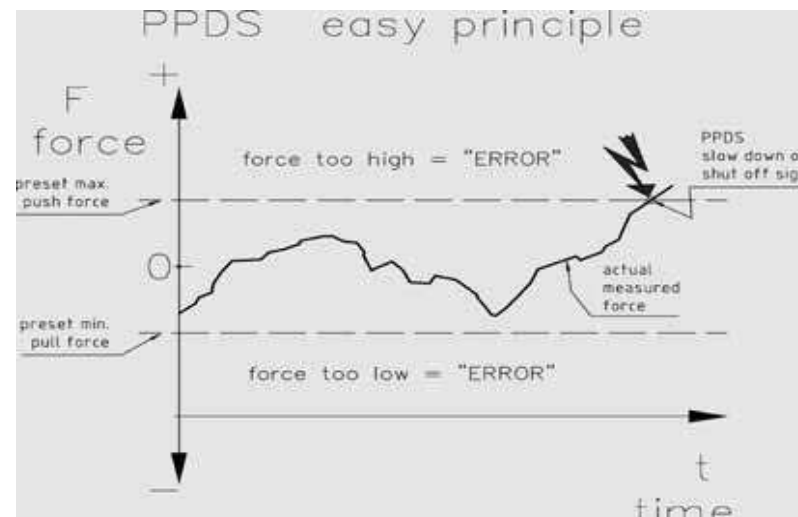
## Special part – PPDS (Push Pull Detection System)



- ▶ Prevents down time
- ▶ Prevents damage to equipment (max. force is programmed, system stops when force is exceeded)
- ▶ Saves money
- ▶ Improves operational safety through preventive maintenance & fine tuning of the system



Push-/Pull-force monitoring with the igus® PPDS System

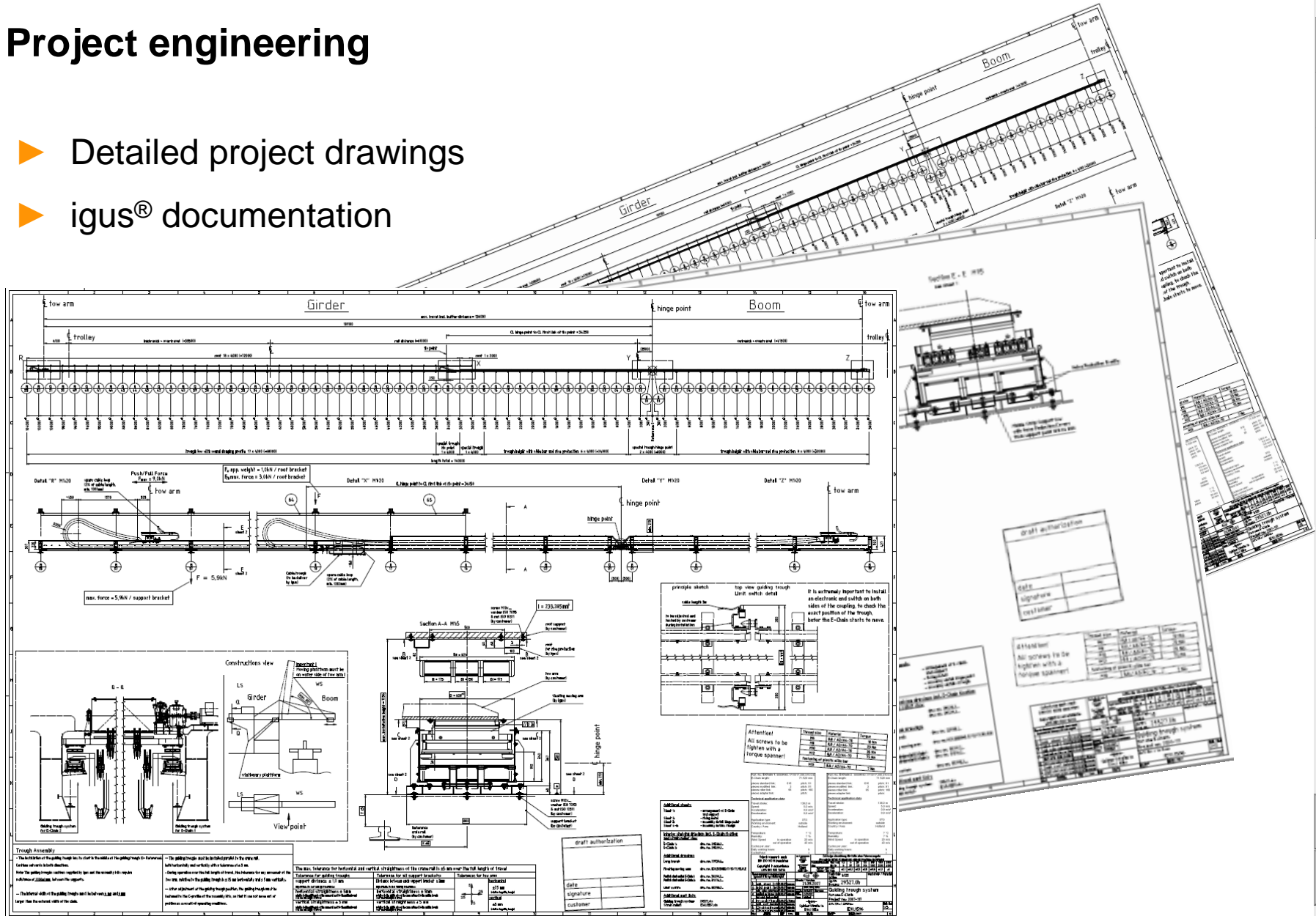


Easy PPDS – continuous real force measurement and limit comparison

# igus® - Crane components & services

## Project engineering

- ▶ Detailed project drawings
- ▶ igus® documentation

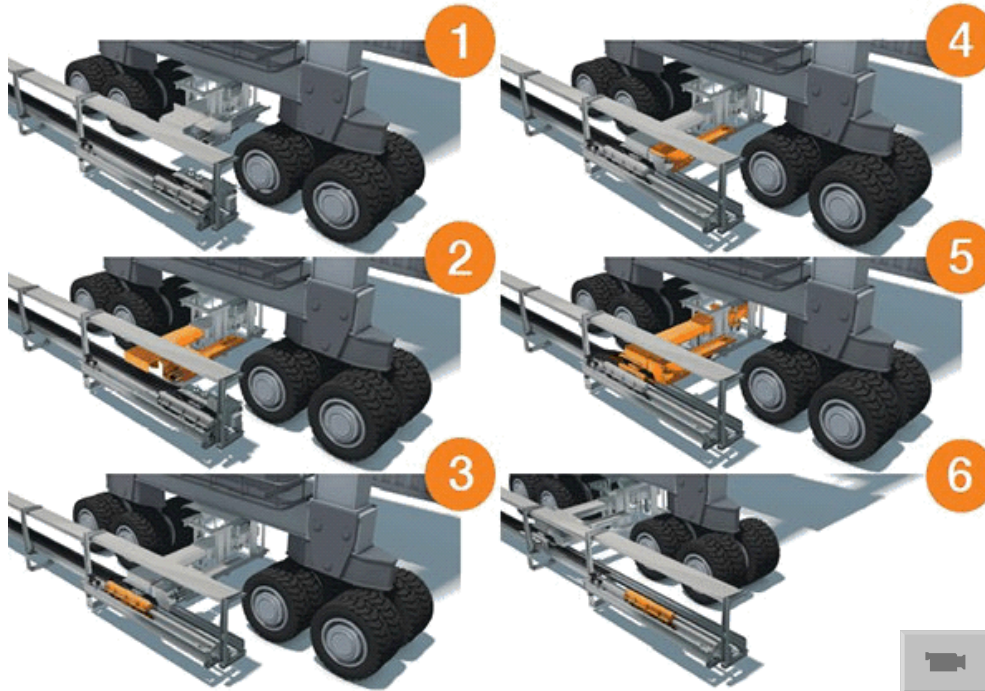




# igus® - Crane components & services

## Special part – e-rover

Main power supply for RTG's



**Switch of your diesel engines!!!**

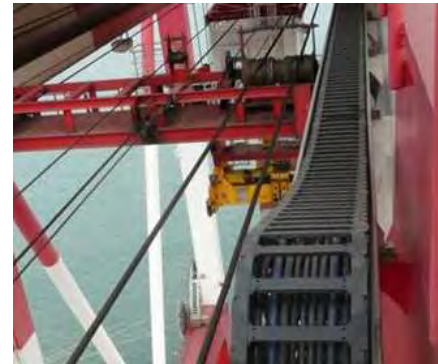
- ▶ Fast & secure automatic coupling system
- ▶ Coupling arm compensation +/- 400mm horizontally & +/- 300mm vertically
- ▶ Long travels up to 800m are possible
- ▶ Interference-free, high speed data transfer through igus® fiber optic cables
- ▶ All media can be conducted in one system
- ▶ Almost maintenance free



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# igus® e-chainsystems®

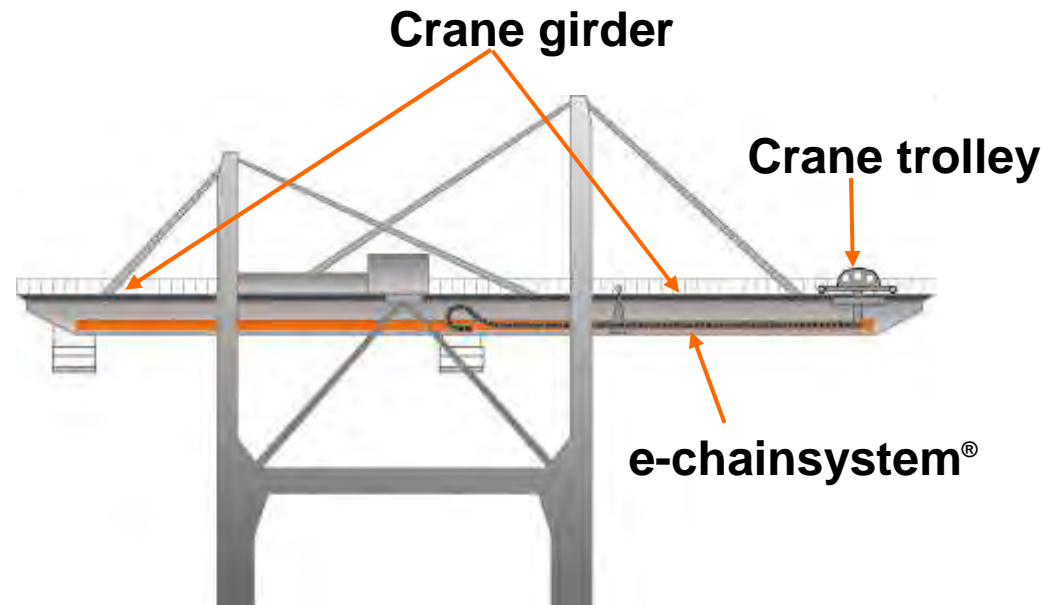
## Crane applications for e-chainsystems®





# igus® - Crane applications

## Trolley travel STS





# igus® - Crane applications

## Trolley travel RMG



P4.56R-System is running successfully on 5 Künz RMG's



# igus® - Crane applications

## Trolley travel RTG



**e-chainsystem®**

# igus<sup>®</sup> - Crane applications

## Crane travel



**e-chainsystem<sup>®</sup>**



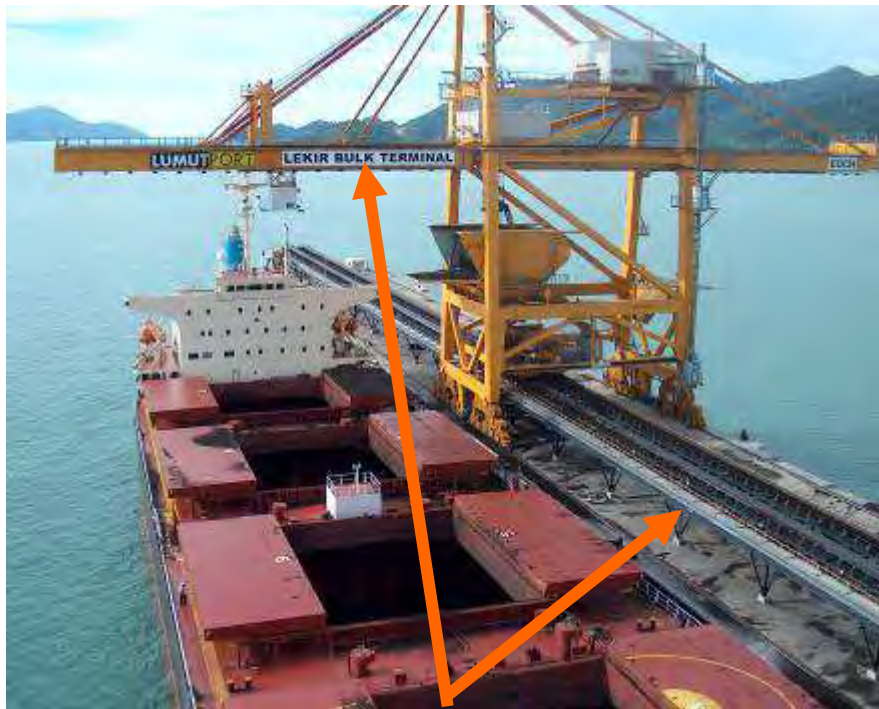
### **Bulkhandling Crane**

Travel: 224 m  
Speed max.: 40 m/min  
Acceleration max.: 0,2 m/sec<sup>2</sup>  
energy chain<sup>®</sup>: 4040CR.22.300.0  
chainflex<sup>®</sup> Types: CF11 / CF9 / CF34  
Location: China



# igus® - Crane applications

## Crane travel



**e-chainsystem®**



### **Shipunloader Crane**

Travel:	441m
Speed max.:	30 m/min
Acceleration max.:	0,1 m/sec <sup>2</sup>
energy chain®:	5050R.28.300.0
chainflex® Types:	CFCRANE
Location:	Malaysia

# igus® - Crane applications

Crane travel

First maintenance after nine (9) years running without downtimes!!!



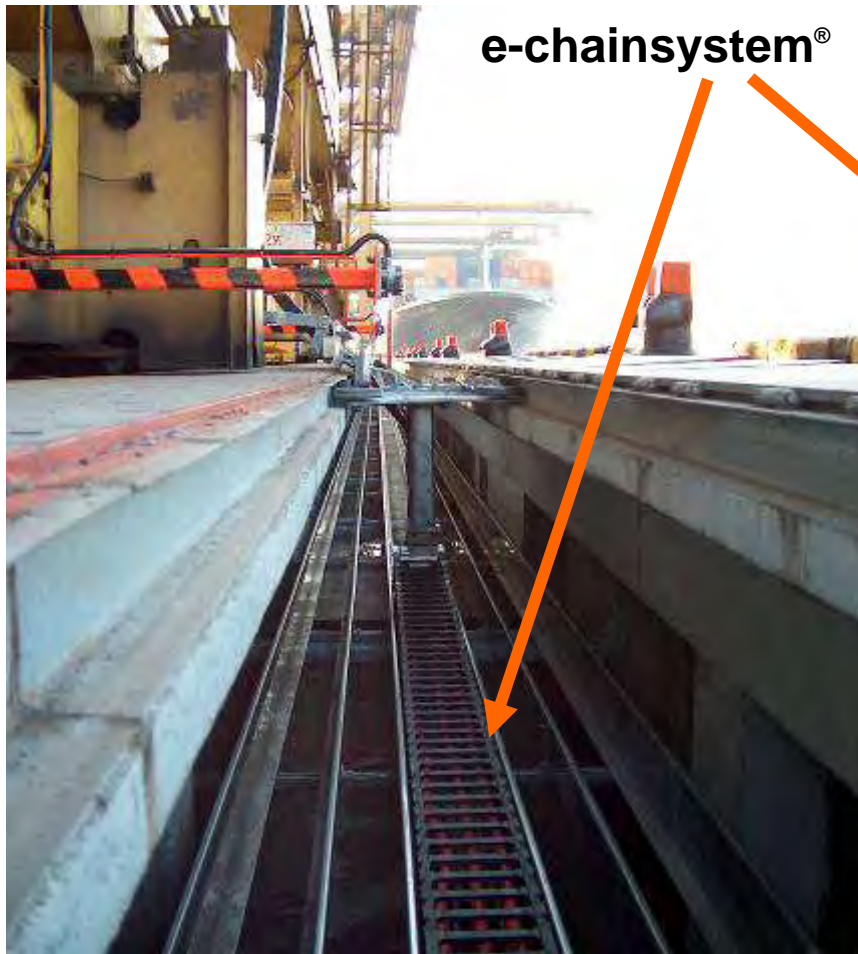
## Ship to Shore Crane, Mainpower Supply

Travel: 130 m  
Speed max.: 100 m/min  
energy chain®: 400R.20.250.0  
chainflex® Types: CFCrane/CF10  
Location: Germany



# igus® - Crane applications

## Crane travel



### **12 Container Cranes, Mainpower Supply**

Travel:	500 m
Speed max.:	46 m/min
Acceleration max.:	0,2 m/sec <sup>2</sup>
energy chain®:	5050RHD.17.300.0
chainflex® Types:	CFCrane
Location:	Asia



# igus® - Crane applications

## Elevator applications



# igus® - Crane applications

## Spreader applications



e-chainsystem®



# igus® - Crane applications

## Reachstacker applications



e-chain®



e-chain®



# igus<sup>®</sup> - Crane applications

## Retrofit STS crane



Before: Festoon System



After: igus<sup>®</sup> e-chain<sup>®</sup>

# igus® - Crane applications

## Retrofit STS crane



Before: Festoon System



After: igus® e-chain®

# igus® - Crane applications

## Retrofit RMG crane



Before: Festoon System



After: igus® e-chain®



# igus® - Crane applications

## Retrofit RTG crane



Before: Cable tender



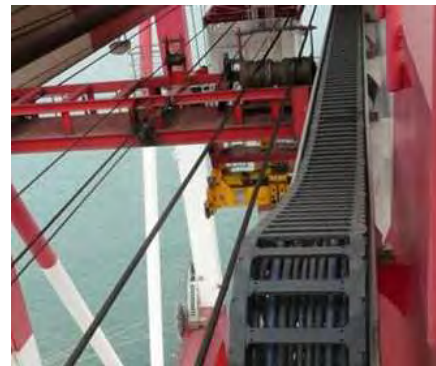
After: igus® e-chain®



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# igus® e-chainsystems®

## References for e-chainsystems®





# igus® - Crane references:



Worldwide:

- ▶ Over 4.100\* RTG's / RMG's (36 with P4 chain)
- ▶ Over 660\* STS (82 with P4 chain)
- ▶ Over 14.000\* Spreader
- ▶ Over 20.000\* Indoor-, Gantry-, Bulkhandling-, Shipyard- and Special Cranes

\* January 2014





# igus® - E-Chain references:

STS-Crane (trolley travel on 3 Cranes)

India



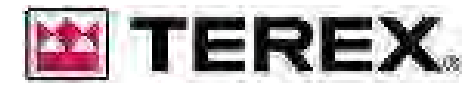
# igus® - E-Chain references:

RTG-Crane (trolley travel retrofit)

India



# igus® - Crane references:





# igus® - Contact:

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