



# Safety Topic

## Working with cranes on barges

ESTA Section Cranes  
20. October 2016

# Crane accident Alphen a/d Rijn (NL)

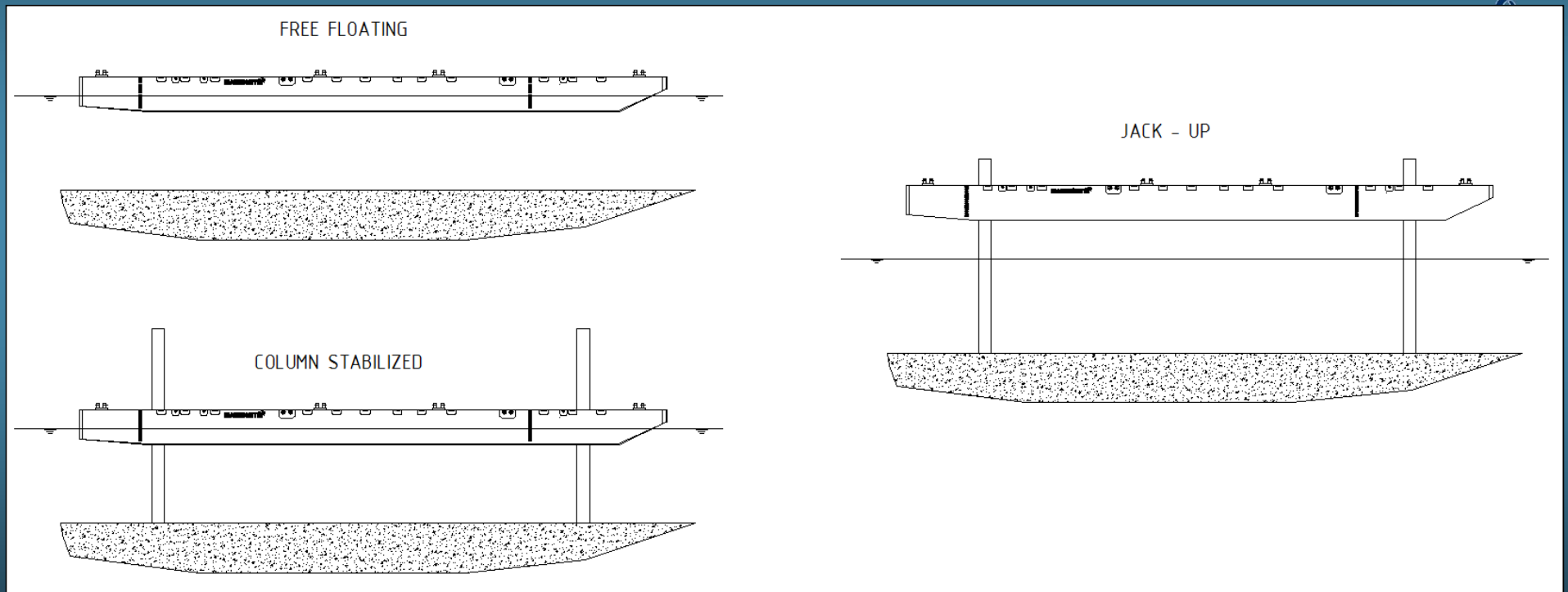


- 29 June 2016 The Dutch Safety Board issued a report based on the findings of the investigations after the crane accident of 3 August 2015 in Alphen a/d Rijn.
- As a result recommendations were put forward towards the whole chain from government downwards

[https://youtu.be/LJevke4\\_i5Y](https://youtu.be/LJevke4_i5Y)

# CRANES ON BARGES

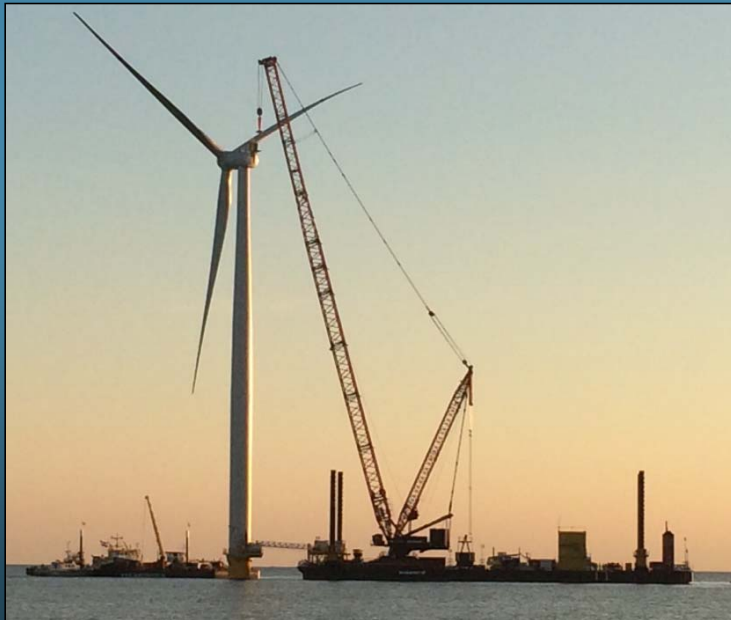
## ➤ Free-floating vs. Column stabilized vs. Jack-up





## CRANES ON BARGES

- A short selection of past projects / previous experiences
  - Westermeerwind Wind Farm Construction Project (Column stabilized);
    - 1x Liebherr LR 11350 on column stabilized barge (85.0x22.0x5.0m)





## CRANES ON BARGES

### ➤ A short selection of past projects / previous experiences

- Installation mats on riverbed in Antwerp port (**Free Floating**);
  - 1x Liebherr LR1750 with Superlift on free-floating barge (100.0x33.0x7.6m)







## CRANES ON BARGES

- A short selection of past projects / previous experiences
  - Installation lock doors Krammer & Hansweert (Free floating);
    - 1x Demag CC6800 on free-floating barge (85.0x22.0x5.0m)





## CRANES ON BARGES

- A short selection of past projects / previous experiences
  - Rotterdam Jetty Installation of pipes with 50m lifting beam (Free floating);
    - 2x Sennebogen 5500-SL on free-floating barge (65.0x15.0x3.3m)





## CRANES ON BARGES

### ➤ A short selection of past projects / previous experiences

- Several occasions, offshore lifting on Jack-up vessels e.a. Seafox 4/Geosea (Jack-up);  
→ Liebherr LR 1750 / LR1600 – Lifting cooler banks







## CRANES ON BARGES

### ➤ Working with Cranes on barges.....needs special attention

- Crane limitations;
- Barge limitations;
- Environmental limitations;
- Workability;
  
- An integral approach is key for safe delivery!



## CRANES ON BARGES

### ➤ Crane limitations

- Manufacturers instructions;
- Max. allowable wind;
- Max. allowable static inclination;
- Fatigue of the crane components;

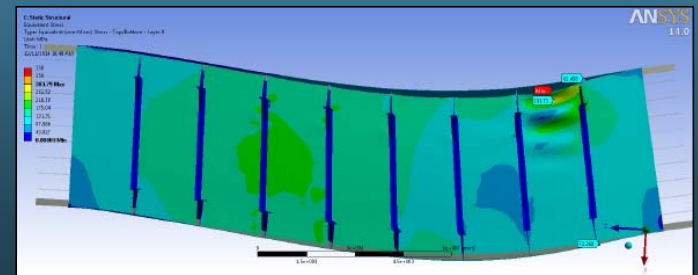
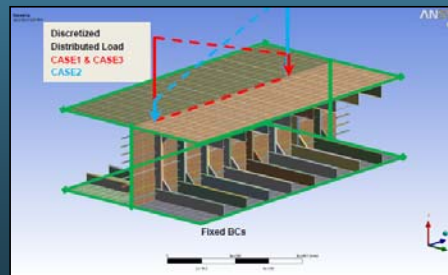
!! The report as made-up by the Dutch Safety Board as a result of the accident in Alphen a/d Rijn identified that the bending of the boom has a negative impact on the stability of the barge. Although the effect is clear, Mammoet is in the process of investigating internally how we can quantify this effect better for different types of hydraulic cranes.



# CRANES ON BARGES

## ➤ Barge limitations

- Free-floating - Intact stability condition (acc. to Noble Denton guidelines 0030/ND);
  - » Sailing condition (boom down)
  - » Lifting condition (boom up with load in hook)
    - Stability range
    - Wind overturning
    - GM value
- Free-floating - Resulting static inclination caused by operational wind loading on crane, barge and lifted cargo to be determined and to be checked against the limiting crane inclination (0.3 deg.);
- Jack-up - max. leg loads during crane movement of any sort;
- Column stabilized - max. leg loads during crane movement of any sort;
- Column stabilized - determination of dynamic leg loads due to waves and wind;
- Structural strength of barge



## CRANES ON BARGES

### ➤ Typical by Mammoet applied rules & guidelines

- GL Noble Denton guidelines
- Det Norske Veritas (DNV)
- Lloyds Register (LR)
- International Maritime Organization (IMO)

GL Noble Denton





## CRANES ON BARGES

### ➤ Environmental limitations

- Closely monitor the Harbor-, sheltered- or offshore conditions to be within operational limits;
- Tidal range and currents, especially important for column stabilized barges;
- Water depth, especially important for column stabilized- and jack-up barges;
- Soil conditions to be known checked and verified for column stabilized- and jack-up barges;
- For all solutions it is key to have reliable weather forecasting at hand!
  - Expected wind
  - Expected wave height and wave period





## CRANES ON BARGES

### ➤ Workability

- Efficient communication;
- Efficient monitoring tools;
- Operation needs to be split up in workable step;
- Operation needs to be executed in workable environmental conditions;
- Working on water involves additional measures regarding safety;

# CRANES ON BARGES



## Questions?

European Association of abnormal road transport and  
mobile cranes [ESTA]