

# **Eskom perspective on specifications for large ACC's**

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- ACC specification
  - Performance specification
  - Minimum design features
- Specification for maintenance
- Conclusion
- Acknowledgements
- References

## Performance specification

- ACC performance requirements are specified and supplier is responsible for all design aspects of the ACC
- Performance guarantees are verified by acceptance test
  - Verification of low wind speed thermal design
- Suitable specification for smaller installations or where a performance drop during adverse weather conditions can be tolerated
- Low risk to supplier since test codes limit wind speed during test

## Risks for purchaser associated with performance spec

- Supplier may assume that safety margins or features added to their bid would render them less competitive
- Purchaser may not be able to disqualify offers or justify more expensive offers
  - All offers claim to meet requirements
- Performance characteristics of ACC in wind remain unknown until commissioning
  - Too late to implement design changes if required
- Successful test offer no guarantee that performance will not degrade significantly under high wind speeds

# Matimba power station

- 6 x 665 MW coal-fired
- Last Unit commissioned 1987
- ACC with 48 30ft fans per Unit





## ACC specification:

- Performance specification

## Operational experience:

- Capacity loss during adverse weather (high temperature, wind speed & direction) is significant
- 12 vacuum related units trips occurred at Matimba during first 7 years of operation

## Performance test was successful

- Test done during favorable wind direction

**Conclusion:** Performance specification is not acceptable due to high performance risk



## **Purchaser specifies minimum ACC design features to mitigate performance deterioration during wind**

### **Advantage to Purchaser**

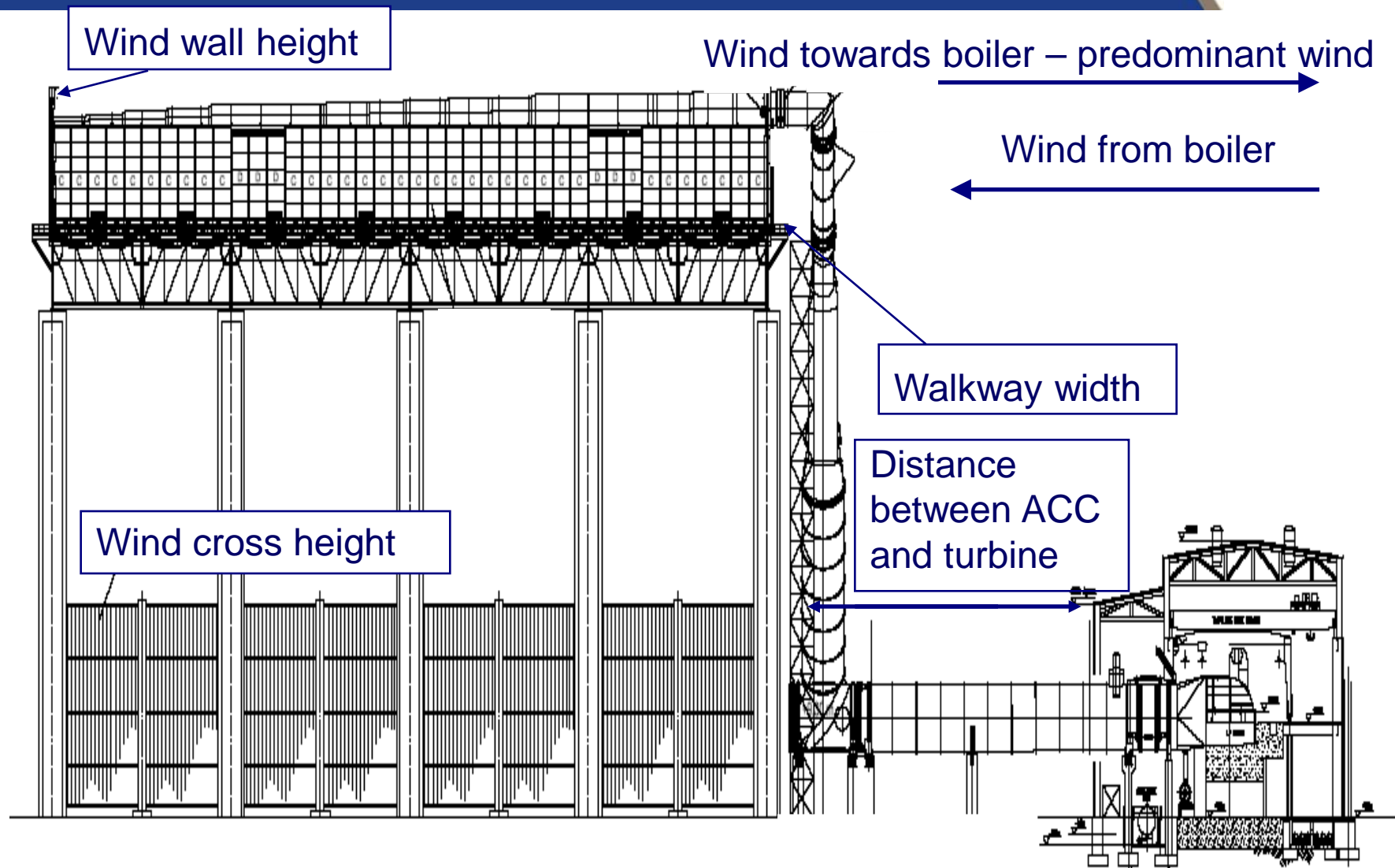
- All offers must comply with minimum requirements
  - No surprises during tendering process
- Plant layout is fixed at early stage
- Mitigation for wind effect is incorporated in design
  - Performance margin to offset deterioration during wind is specified by purchaser

### **Advantage to Supplier**

- All suppliers tender on same basis
  - Design requirements are defined
- Low wind speed design criteria
  - Performance test wind speed limited to test code conditions

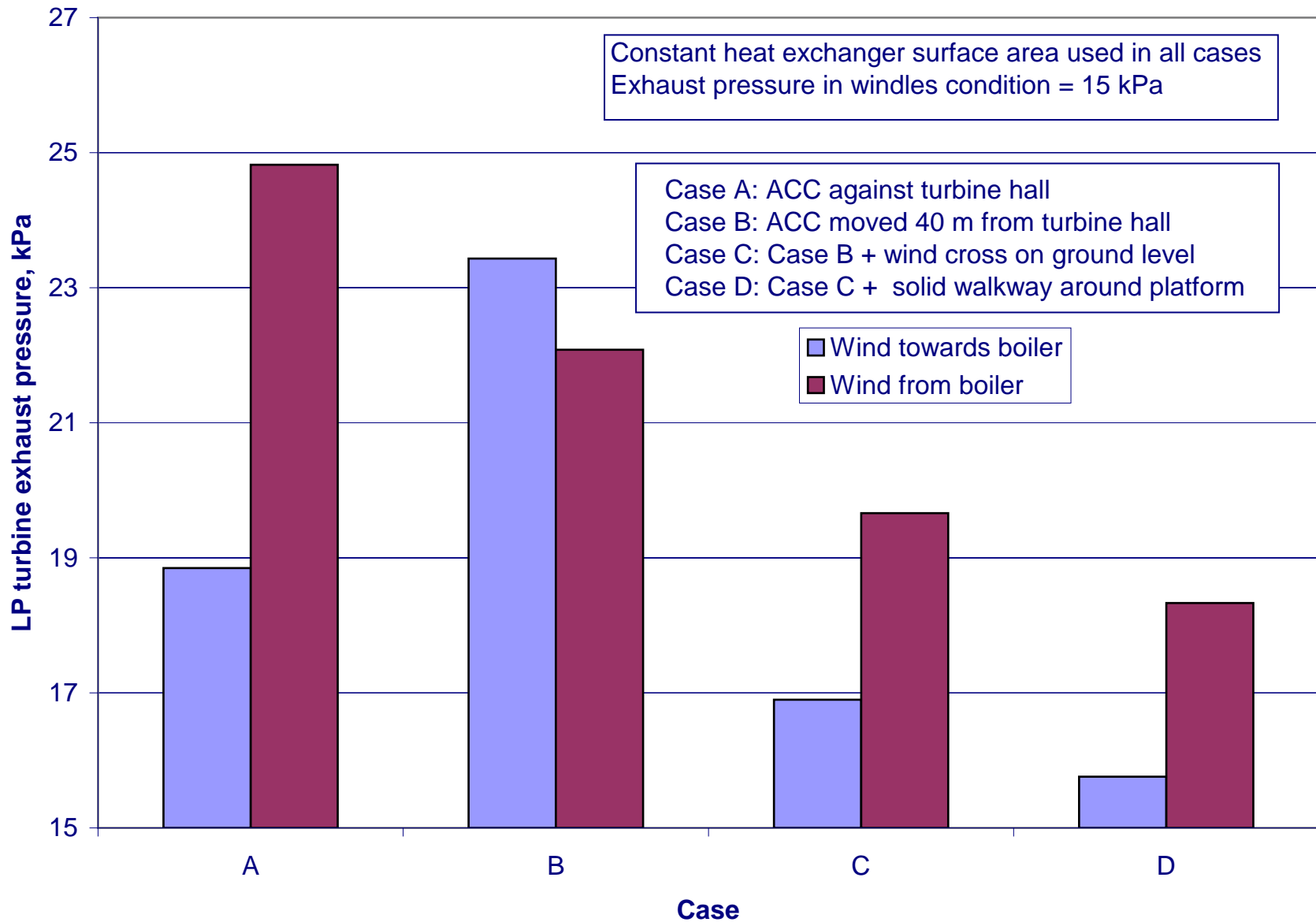
Requirement: Purchaser to perform basic analysis in advance

# Features to be specified by purchaser





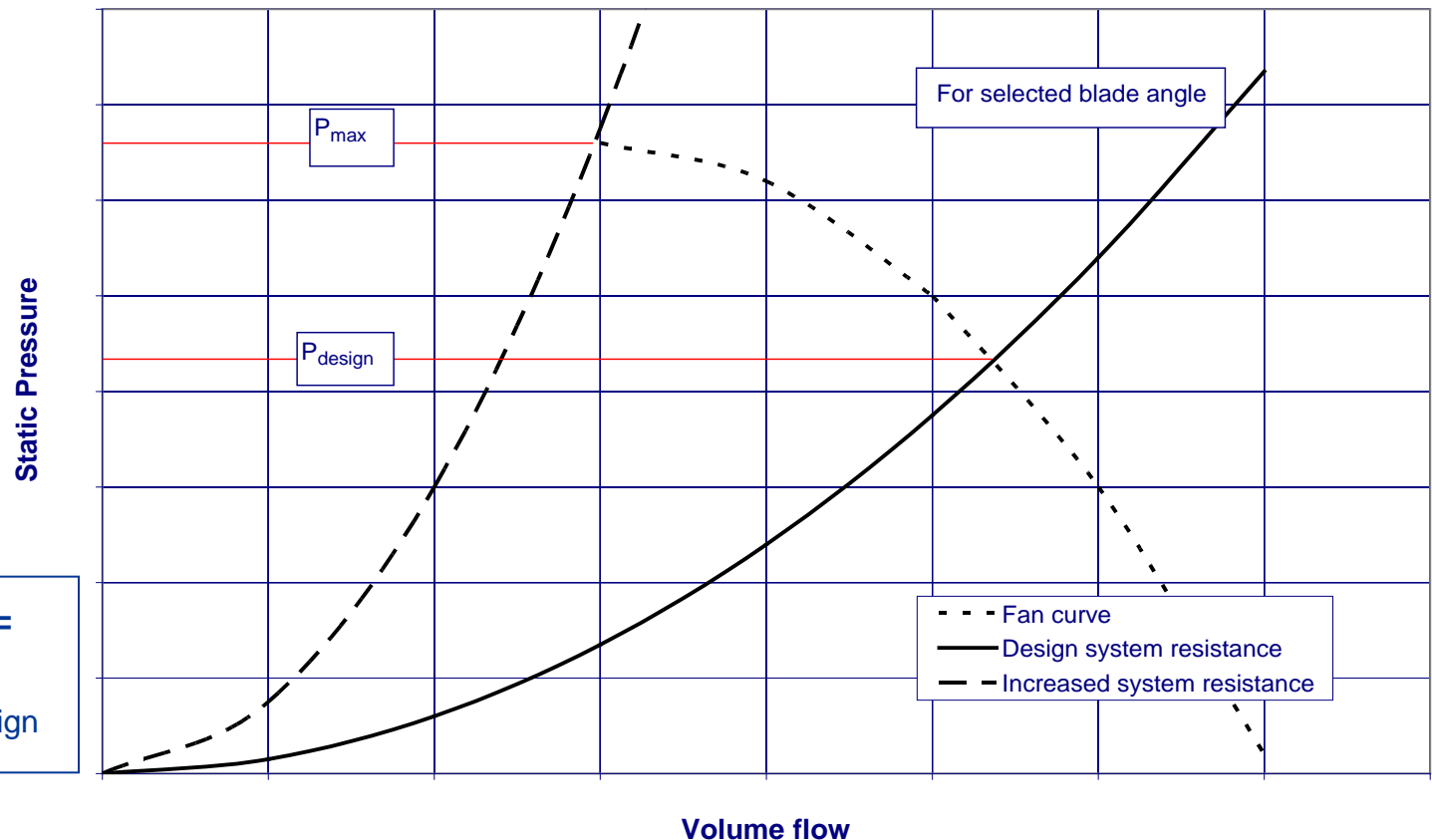
# ACC performance trends in wind (9m/s)



# ACC fan pressure margin

Importance of fans are generally underestimated

- Purchaser to specify minimum fan pressure margin
- Recommend >50% for low wind speed ACC design
  - For Matimba this margin is about 10% - inadequate



- Effect of upstream and downstream obstacles on fan performance can be significant
  - Supplier information may underestimate effect on fan performance
- Purchaser to specify minimum clear distances on upstream & downstream side





## Purchaser to specify minimum features to facilitate maintenance

Matimba ACC walkway  
(maintenance platform)

Note:

- Solid walkway
- Steps onto fan bridge
- Hinged doors
- Maintenance hatch away from street entrance











# Medupi & Kusile power stations

- Medupi 6 x 794 MW coal-fired, Kusile 6 x 798 MW coal-fired
- Currently under construction
- ACC's with 64 34ft fans per Unit



## Medupi ACC walkway (maintenance platform)

### Note:

- Wider solid walkway
- No steps onto fan bridge
- Sliding doors
- Maintenance hatch away from street entrance





# Specification for maintenance

- Access & reachability for maintenance on fans
- Plant & personnel safety – fatigue failures on fans



# New plants maintenance aspects

- Access from fan bridge to grid underneath fan
- Access to fan U-bolts & hub bolts (nuts at top)
- Grid designed to:
  - Take point loads of maintenance personnel
  - Take weight of falling fan impeller
  - Be as “porous” as possible in order to minimize effect on fan performance



- Purchaser to specify minimum ACC design features
  - Must be an Informed Client
  - Purchaser to perform CFD analysis to determine minimum design features & plant orientation
- ACC performance can be stabilized in wind without need to add heat transfer area
- Specification for maintenance important to ensure easy maintainability, potentially increase availability

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Thank you

