Survey: Primary Problem Issues with Air-Cooled Condensers

ACCUG 2025

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Top ACC Issues / Concerns

The ACCUG Steering Committee conducted a survey of ACC Interested Persons. The intent was to capture priority concerns for ACC operators in order to provide a focus on areas of greatest need for problem resolution.

Respondents: about 20

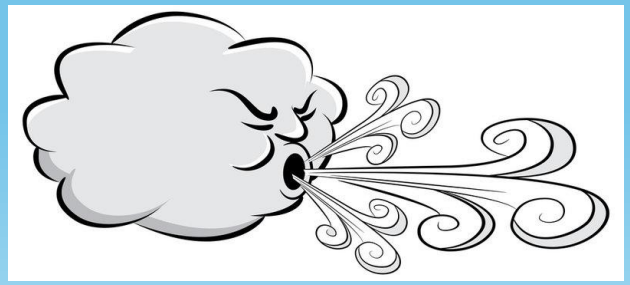
Number of issues: 4 primary, 17 total

1. Generation losses in hot weather

- Generation loss in hot weather (which can also be compounded by air in-leakage)
- Maximising plant power generation during hot weather
- Mitigating generation losses in high heat and/or high wind conditions.
- Load limited in summer hot weather.
- Generation loss in hot weather

2. Generation loss due to wind

- Power loss due to high wind speed and direction; 3 m/s ACC design is not adequate for actual conditions. Limited studies confirming results for wind screens
- Wind derates; uncontrolled and difficult to predict, wind screens have not been effective
- Hot weather operation especially during high winds



3. Air in-leakage / air removal

- Air in-leakage is our top issue
- Our air in-leakage started causing us real problems from about 2017
- Need reliable techniques for identification of air ingress in ACC (instead of conventional method such as use of Tracer Gas)
- Air leakage/ejector performance.
- Best practices to minimize air in-leakage in cycling mode winter condition due to moving tubes and required usage of sealant time to time
- Service Providers for carrying out Air ingress detection and repair maintenance of Condenser tubes
- Typically vacuum pumps for air removal

4. Gearboxes

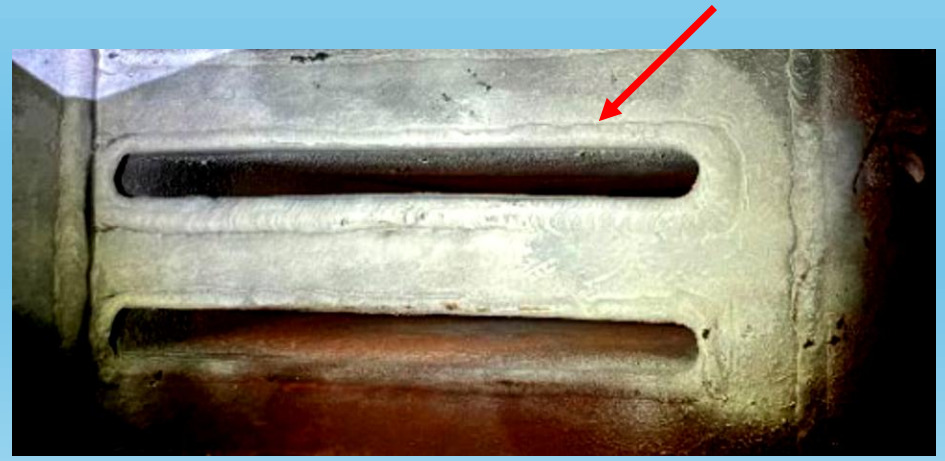
- Oil leaks and cleaning oil from finned tubes (induced draft)
- Containment of potential leaks
- Gearbox drive & output shaft seal leaks
  - Existing seals have caused wear on input/output shafts, exacerbated by sludge buildup
- Bearing column durability and rebuild
  - Bearing columns undersized and prone to failure, including shaft failure/breaking; identify vendors who perform column rebuilds.
  - Anti-rotation device is another weak point in design
- Obsolescence and replacement is different size (greater height)
- ACC fan gear box, Amarillo make, is obsolete.
- Gear box failures

5. Optimizing Efficiency

- ACC performance not done since commissioning
- Minimising ACC power consumption for target vacuum
- Improving plant availability
- Improvement of energy efficiency

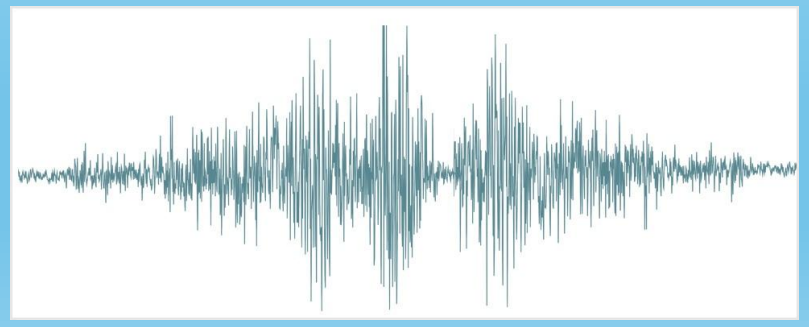
6. Leak Repairs on ACC Tubes

- The current method we use can be challenging to apply and eventually fails over time; a more durable repair method would be beneficial
- Tube repair strategies



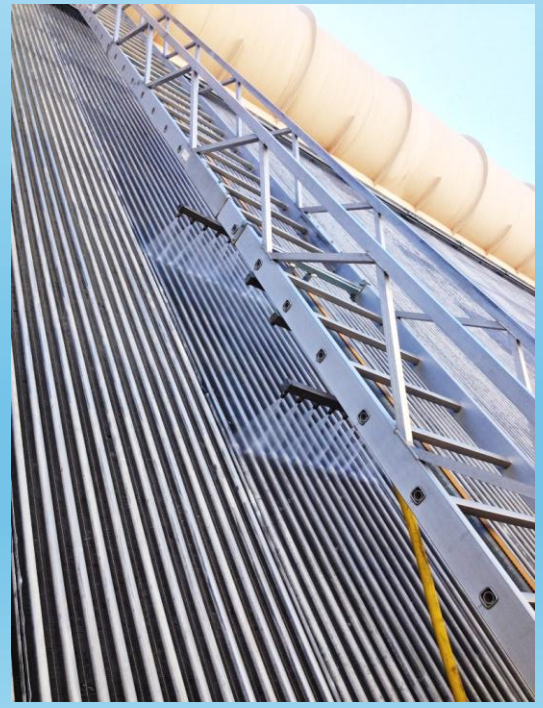
7. Vibration

- Vibration - structural and motor, leading to reliability issue
- High vibration at ACC fan bridge. The structure of the ACC is flexible and the vibration is high. Two cases of high vibration led to all gearbox failures after many years. Solution of increase stiffness of the ACC structure should be studied



8. Water Washing Systems

- Minimize loss of metal by using conventional water wash system (regular service water, not demineralized water)



9. Equipment Reliability

- Fans blades life preservation operationally, maintenance, engineering
- Reliability of fans, gearboxes, belts

10. How to Approach Issues in ACC Structures to Identify & Address Defects

11. Effect of Fan Blade Pitch on Heat Transfer

12. Reduction of noise from the air coolers and condensers

13. Preservation life of ACC (tubes, headers, etc) cycling plant by operational methods, vacuum condition support (when plant is down and ACC accordingly)

14. Cold weather startups causing steam header cracks

15. Vacuum pump seal water temps during high ambient temps (pulling steam into separator tank

16. Instrumented tube inspection

17. Equipment pressure boundary remaining life estimations / managing equipment life cycle; equipment pressure boundary repair and remediation strategies

Discussion / Questions