MinWaterCSP

Minimized water consumption in CSP plants

Reference fan on-site installation
WP 8, Deliverable 8.4

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Author:
Francois Louw (Kelvion thermal solutions)

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31/10/2016	REV00	Francois Louw / Kelvion (GAS) Johan van der Spuy, Danie Els, Jacques Muiyser / SUN Chris Meyer, Hans van Kamp / Notus	Demonstrable for installation of Reference fan

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1 Introduction

1.1 Background

As part of the MinWaterCSP H2020 project, a 30 ft axial flow fan, termed the Reference fan is manufactured and tested. This fan will serve a reference for the newly designed CSP fan also forming part of work package 8 (as well as work package 3). The testing of the Reference fan is divided into two categories:

- Laboratory testing at Stellenbosch University (SUN).
- On-site testing at Matimba power station, RSA.

For the latter testing (on-site testing) the installation of the 30 ft Reference fan was stipulated as a deliverable (8.4) in the H2020 MinWaterCSP grant agreement. This document serves as a confirmation of this deliverable. The remainder of this document gives some information and pictures of that the fan has been installed successfully and is presently running at Matimba power station. The on-site testing is presently in progress and will be included in the testing document (deliverable 8.5, due in M12).

1.2 Reference fan overview

The Reference fan is an 8 bladed axial flow fan, specifically designed by SUN (Bruneau, 1996) for air cooled condenser (ACC) applications from a need to improve on fan static efficiency. This fan has also been the subject of many other research outputs at SUN to understand performance and spatial flow field characteristics of fans in general and build improved numerical models for the modelling of ACC performance (Meyer and Kröger, 2001), (Meyer and Kröger, 2004), (Bredell *et al.*, 2006), (Louw *et al.*, 2012), (Louw *et al.*, 2015). From laboratory testing in a BS 848, type A test facility, the maximum fan static efficiency of this fan is in a bandwidth between 64 and 67 % (Louw *et al.*, 2015).

1.3 Matimba power station

Matimba power station (figure 1.1) is a 6 x 665 MW coal-fired power station situated in Lephalale, RSA. Primary steam cycle heat is rejected by means of an ACC consisting of 288 axial fans, where each fan is 30 ft in diameter. Hence, the ACC of each power producing unit consists of 48 fan units (arranged in an array of 8 streets by 6 rows).

1.4 Reference tasks as per the grant agreement

Deliverable 8.4 is a result of the completion of Tasks 8.3.1 to 8.3.5 and part of 8.3.6. The first part of Task 8.3.6 is the installation of the Reference Fan at Matimba Power Station. This part has been completed as part of Deliverable 8.4. The outstanding activities of Task 8.3.6 is the performance testing of the Reference Fan, which is due in M12 under Deliverable 8.5, as referred to above.

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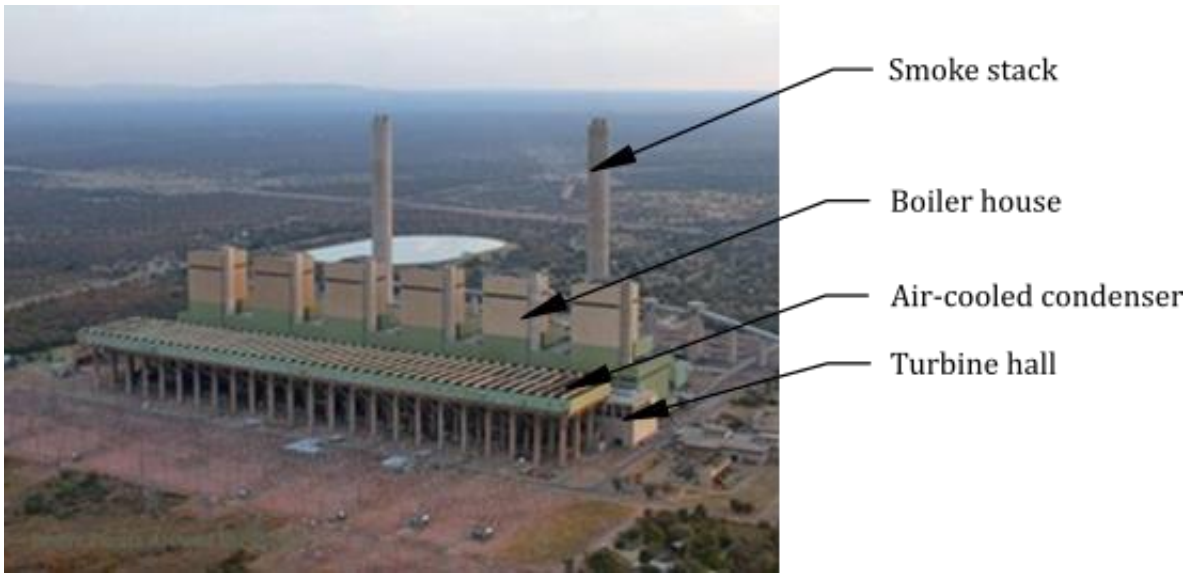

Figure 1.1: Matimba power station

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2 Reference fan installation

For the present fan installation, one of the fans in unit 3 of the power station was replaced with the 30 ft Reference fan as indicated in figure 2.1. The progress and completion of the fan installation and operation can be observed in figures 2. to 2..

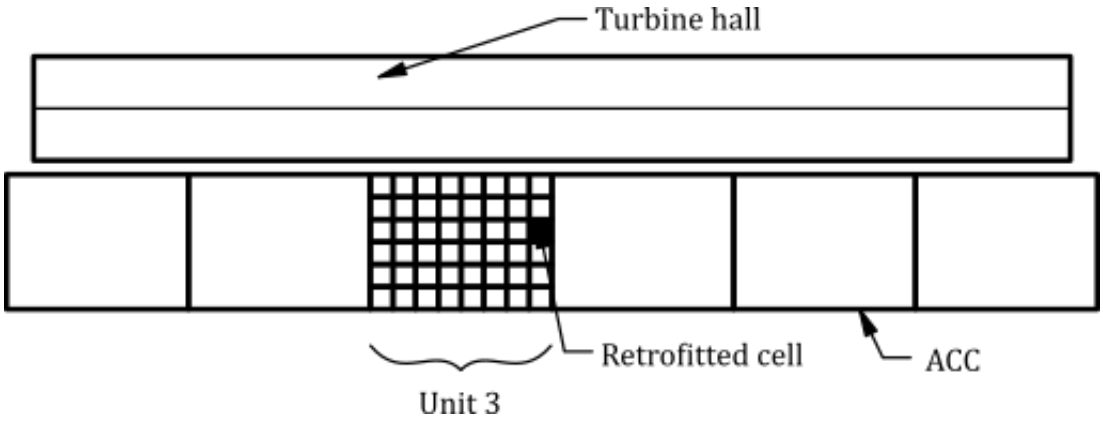

Figure 2.1: Top view of Matimba ACC showing the location of the retrofitted cell

Figure 2.2: Reference fan transport and arrival at Matimba Power Station

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Figure 2.3: Progress on Reference fan installation

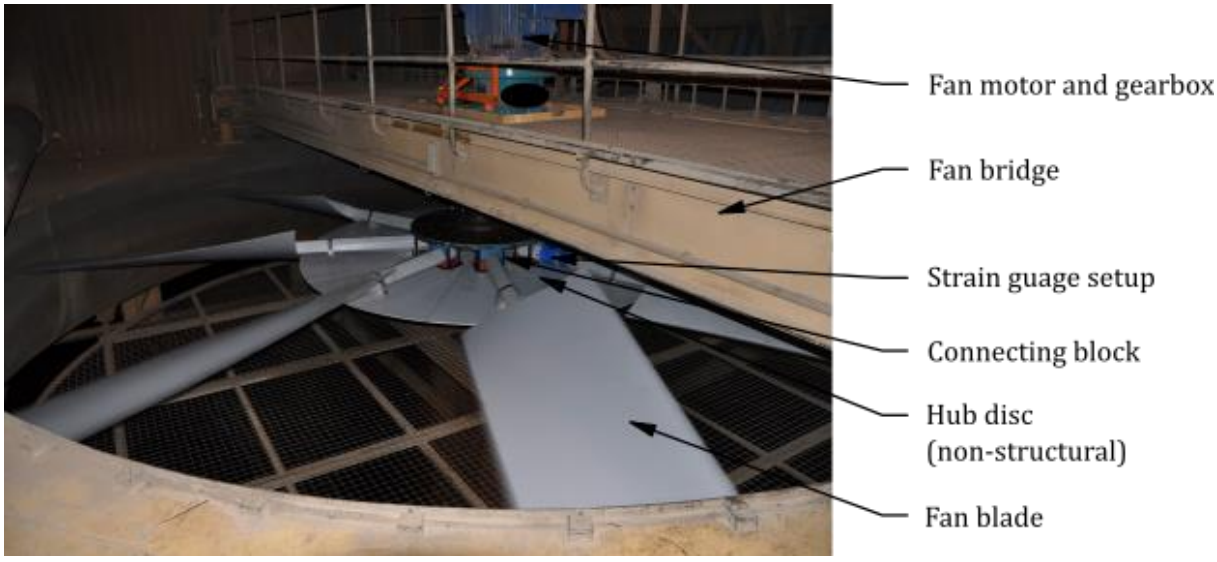

Figure 2.4: Completed Reference fan installation viewed from inside the plenum chamber

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Figure 2.5: Completed Reference fan installation (centre) viewed from below the ACC platform

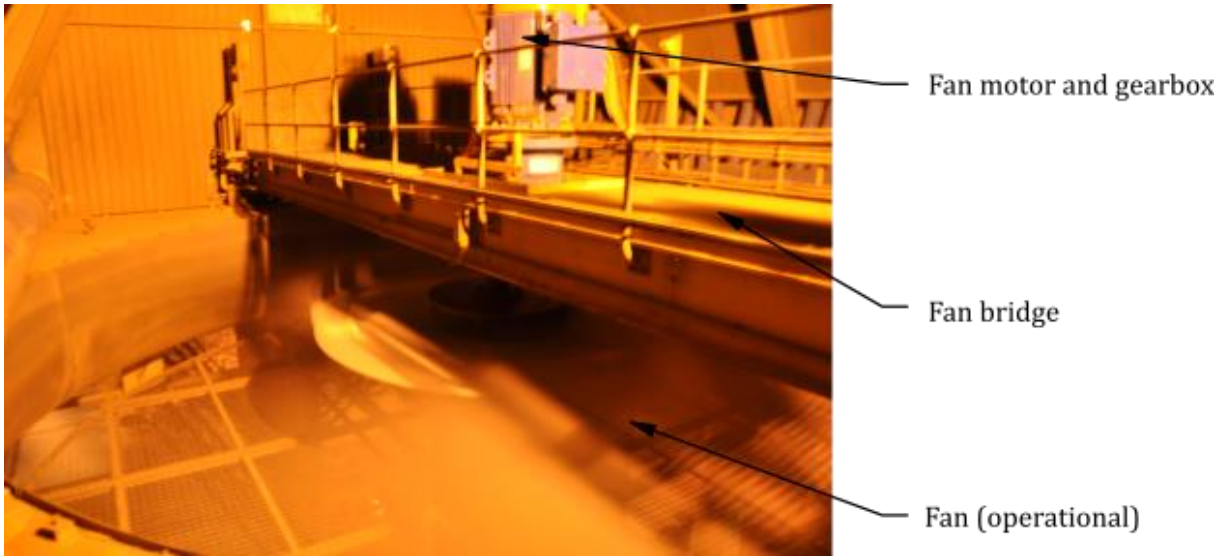

Figure 2.6: Operational Reference fan viewed from inside the plenum chamber

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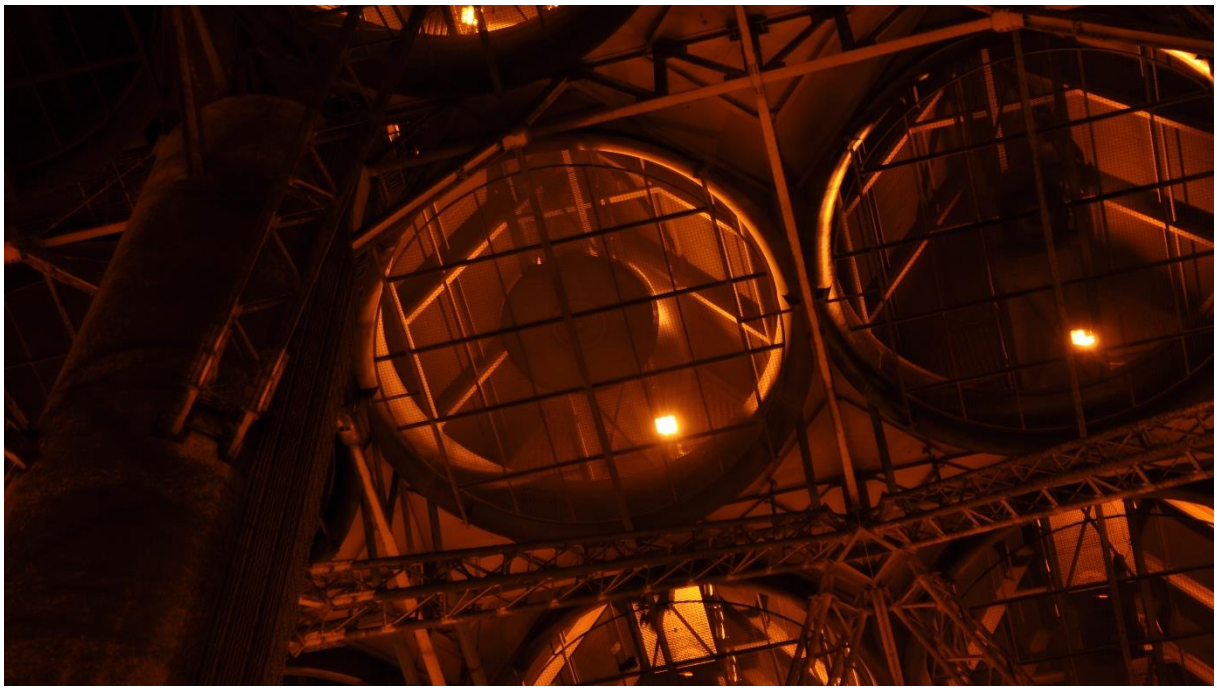

Figure 2.7: Operational Reference fan (centre) viewed from below the fan platform

According to the H2020 MinWaterCSP grant agreement, the fan will remain operational at least until the end of M36 of the project (end 2018). Intermittent experimental tests conducted on this fan will contribute to the final report due at the end of 2018.

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