

MEASUREMENT OF TURBULENCE IN LP PART OF THE 1090 MW STEAM TURBINE

Pavel Antoř / IT CAS
Václav Uruba / IT CAS
Pavel Jonáš / IT CAS
Pavel Procházka / IT CAS
Vladislav Skála / IT CAS

Michal Hoznedl / DSP
Kamil Sedlák / DSP

ABSTRACT

The aim of the paper is to demonstrate a use of the hot-wire anemometry for measurement of turbulent fluctuation in a steam turbine. Measurement technique and used methods are presented in the paper. An experimental research was performed in the last stage of LP (low-pressure) part of the 1090 MW steam power-plant turbine. The experiment was carried out by Institute of Thermomechanics of Czech Academy of Science (IT CAS) in cooperation with Doosan Škoda Power s.r.o. (DSP), the manufacturer of the turbine.

INTRODUCTION

The measurement points were located in two planes: in the front and behind the last stage of the LP section of the steam turbine. There was performed a number of points with varying radial coordinate in each plane. A constant-temperature anemometers DISA M10 and Dantec StreamLine were utilized. Several hot-wire probes with a single 45-degree slanted wire of a diameter of 0.005 mm and a length of 1.25 mm were used. A method of rotating probe with slanted wire was applied to determine three components of velocity fluctuation.

RESULTS AND DISCUSSION

Measurement technique was described in the paper. An example of anemometer signal is shown in Figure 1. A coarse water droplet hitting the hot-wire sensor makes a visible peak, that should be filtered out. A vector of a mean velocity and three components of velocity fluctuation may be evaluated using the rotating probe method.

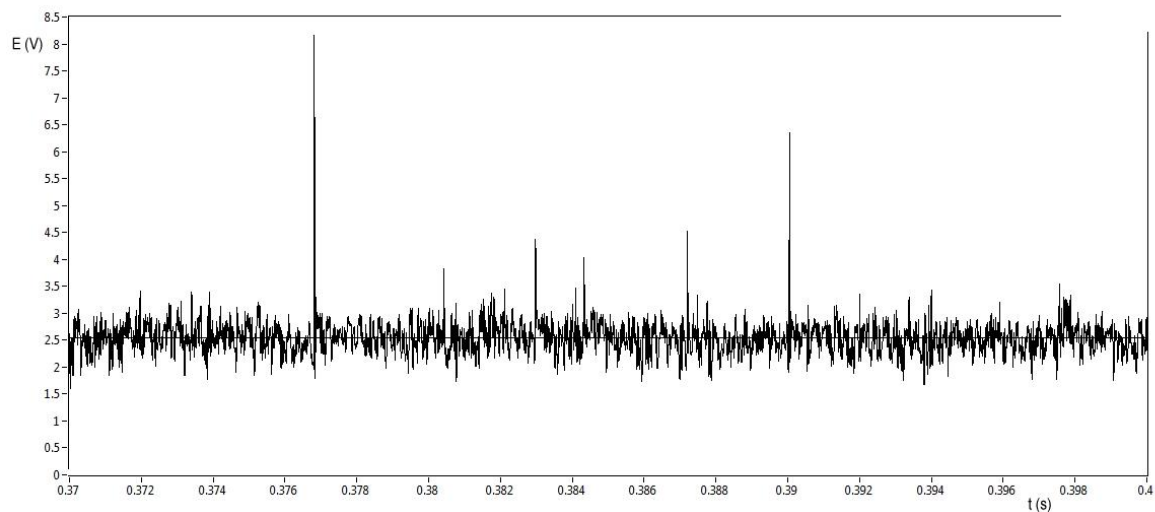


Figure 1. Anemometer signal of steam flow with water droplets

REFERENCES

Jonáš P.: Rotary slanted single wire CTA – a useful tool for 3D flows investigations, EPJ Web of Conferences, 01047, 2013.