

REQUEST FOR EXPRESSION OF INTEREST (EoI)

Boundary layer wind tunnel

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1 Introduction

The Council for Scientific and Industrial Research (CSIR) is an entity of the Department of Science and Innovation (DSI) in South Africa. It is one of the leading scientific research and technology development organisations in Africa. As a public institution established under the Scientific Research Council Act, 1988 (Act 46 of 1988) (as amended by Act 71 of 1990), the CSIR focuses on multidisciplinary research, development and innovation (RD&I). The CSIR boundary layer wind tunnel is unique on the African continent. There are about 30 similar facilities across the world. Boundary layer flow governs the wind situation in the built environment. It can only be replicated and modelled reliably by using correctly scaled down flow parameters. The aim of wind tunnel studies is to optimise structures, their form and spatial distribution; improve the adverse wind environmental impact; and determine the distribution of wind pressures and forces on structures and their elements.

The wind tunnel was established more than 30 years ago at the then National Institute of Building Research. It was subsequently operated by Boutek and the then Built Environment Unit. Functional Building Infrastructure in the Smart Places cluster remains custodian of the wind tunnel and has decisively not executed work in this area, retaining no residual capability in this area of work.

Currently, all the instrumentation is outdated, with some of it having been manufactured in-house about 30 years ago. This is unreliable and prone to failure and distortion of outputs. The supporting software was developed about 20 years ago and is not compatible with modern IT operational systems. A major investment will be needed to get the facility fully operational again. The upgrade of the wind tunnel does, however, present numerous project opportunities to a variety of disciplines. Therefore, EoIs are invited from within the CSIR and external parties.

2 Purpose

The objective of this invitation process is to collect information to enable the CSIR to evaluate and identify suitably experienced, highly qualified and financially sustainable organisations within the wind modelling field, with the view of conducting further research on wind modelling and further improving the wind tunnel, so that it is modernised.

3 Background

- This is a unique wind-tunnel laboratory on the African continent.
- There are about 30 similar facilities across the world (typically in the developed economies and China).
- There are at least a few hundred traditional (mechanical engineering) wind tunnels (the CSIR has a few of them).
- Boundary-layer flow governs the wind situation of the built environment and it can only be replicated/modelled reliably by correctly scaled-down flow parameters. This is mainly in terms of the spatial distribution of gusts and the energy contents, in relation to the scale of built environment.
- In principle, the aim of the wind tunnel studies is to:
 - Optimise structures, their form and spatial distribution;
 - Improve the adverse wind environmental impact; and
 - Determine the distribution of wind pressures and forces on structures and their elements.



Figure 1: The current wind-tunnel



Figure 2: Typical model of the urban environment and the flow-processing devices

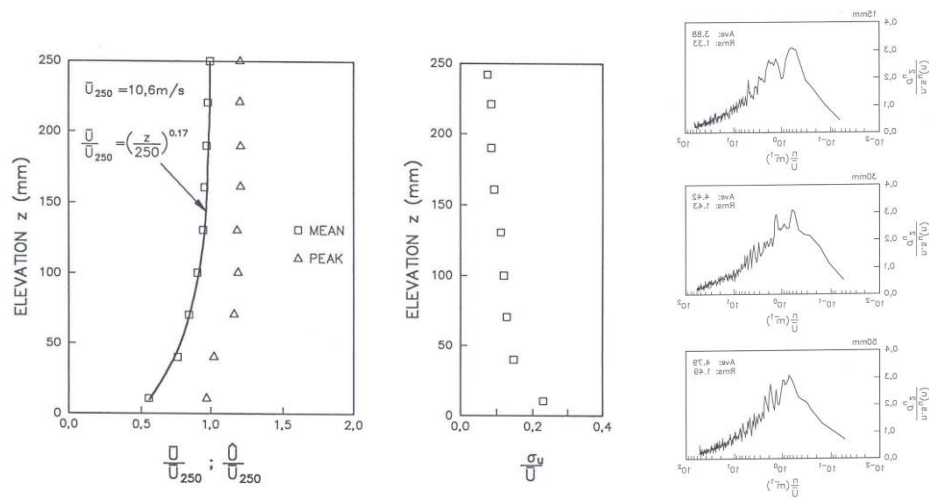
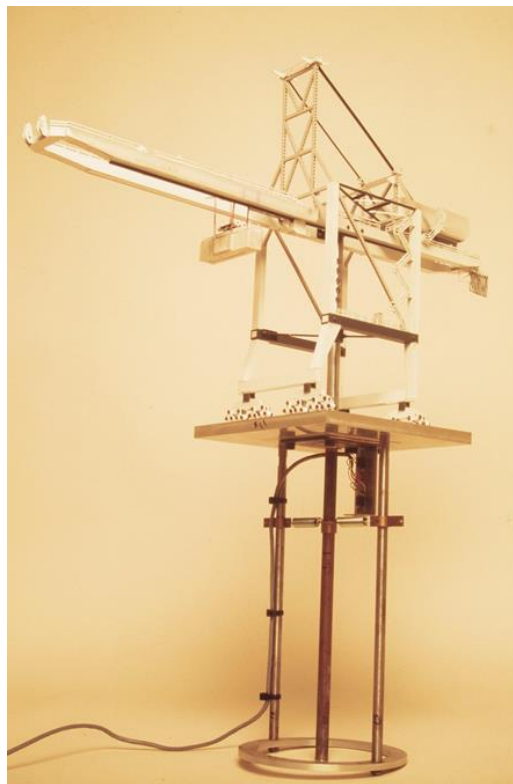


Figure 3: Typical, and most relevant, flow parameters of boundary layer generated in the wind tunnel. These correlate to the wind loading design specifications of the design (e.g., SABS) standards.



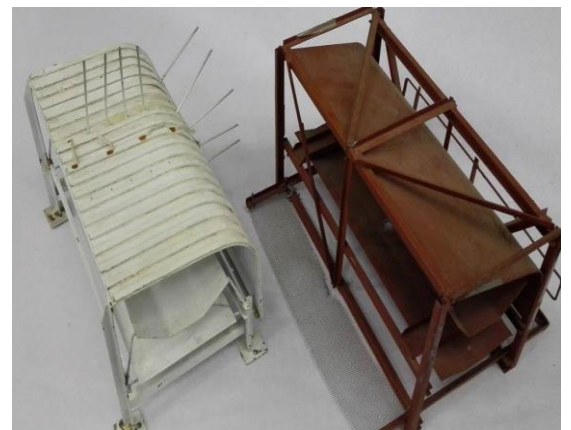
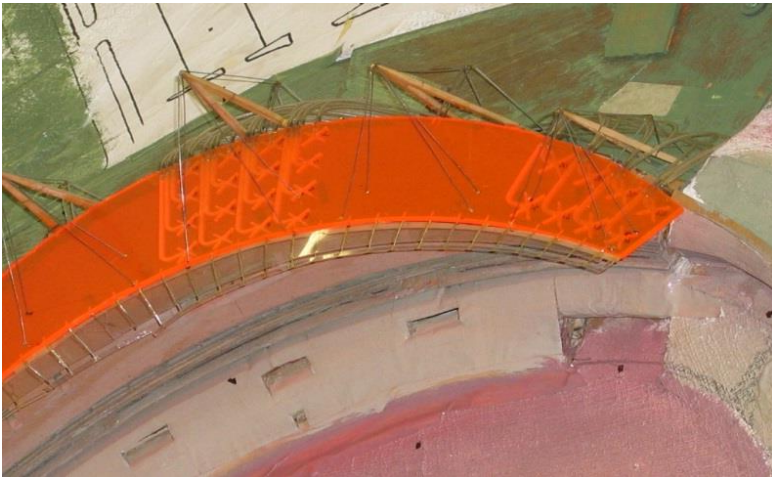
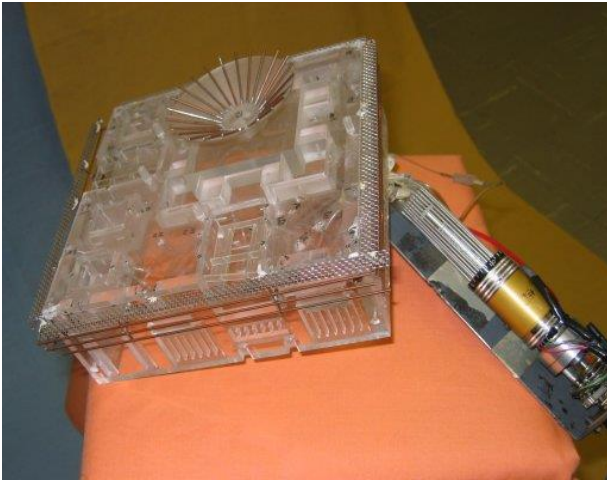


Figure 4: A collage of wind tunnel models (and one full-scale, re. Antarctic station) that demonstrate the type of structures that can be modelled/investigated in our laboratory,

i.e. for distribution of wind pressure, forces, wind environmental distribution and topographical modelling.

In general, the measurements are carried out by three basic types of instrumentation/technologies:

- Hot-wire wind speed gauges;
- Multichannel pressure gauges; and
- Force balance.

These also involve several supporting electronic instrumentations, e.g., related signal amplifiers, filters, reference pressure gauges, spectrum analyser, etc.

4 Recommendations for the interested company/personnel

An upgrade/update of the equipment should include the major systems, i.e.:

- The multiple-channel pressure instrumentation (currently Scanivalve);
- Multiple-channel hot-wire probe instrumentation (currently Dantec);
- Electronic force balance and amplifier (currently home-made); and
- Their integration (operating system).

5 Invitation for the Eol

Eols are hereby solicited from relevant organisations with an interest in wind modelling. Interested parties should also have the facility to house the equipment and commit to restoring it to functional use.

6 Submission of Eol

Proposals should not exceed 20 pages and, where relevant, supporting documentation should be attached as appendices. The following documentation must be included:

- Brief company profile;
- Ownership/management information;
- Description of current business activities;

- Evidence of experience/track record in related activities;
- Original valid Tax Clearance Certificate or Letter of Good standing issued by SARS;
- B-BBEE certificate;
- Proof of company registration (CK2 form);
- Bank letter; and
- Annual Report showing financial turnover.
- Concept note setting out a proposed plan of action to restore wind-tunnel to operational use, housing an operation, beneficiaries, use rights, and assurances. Preference will be given to proposals that align closely with CSIR's objectives, which are "through directed and particularly multidisciplinary research and technological innovation, to foster, in the national interest and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic of South Africa."

The Eols submitted by companies must be signed by a person or persons duly authorised thereto.

All Eol submissions must be sent to the following email address: cmunsamy@csir.co.za

Considering the Covid-19 pandemic, the CSIR requires that all Eol submissions be sent to the email address above. File size should not exceed 30 MB and the interested parties can submit Eols in multiple emails. Use the Eol number and the description of the Eol as the subject in your email.

7 Evaluation process and criteria

All proposals will be evaluated by an evaluation committee against the following criteria:

- Experience and track record of operating in the relevant environment;
- Alignment of proposal with CSIR objectives;
- Validity of submission documents listed in section 6, e.g., tax clearance certificate, company registration document, etc.;
- B-BBEE status (transformation agenda); and
- Financial sustainability.

Shortlisted applicants may be required to present to the CSIR and shall be notified thereof no later than four days prior to the presentation date.

8 Elimination Criteria

Eol submissions will be eliminated under the following conditions:

- Submitted to an incorrect address.

Submissions that do not accompany the mandatory documentation as listed above.

9 Cost of submission

Organisations submitting an Eol assume all risks for resource commitment and expenses, direct or indirect, of proposal preparation and participation throughout the Eol process. The CSIR is not responsible directly or indirectly for any costs incurred by the organisation.

10 Process for shortlisted applicant/s

- The shortlisted applicant/s shall proceed into the application phase where further assessments shall be completed.
- The successful applicant shall be subject to the parties agreeing to mutually acceptable contractual terms and conditions. In the event of the parties failing to reach such agreement within a mutually agreed date after the provisional appointment date, the CSIR reserves the right to appoint or not appoint.

11 CSIR reserves the right to:

- Extend the closing date;
- Request documentary evidence regarding any issue; and
- Cancel or withdraw this Eol as a whole or in part.

12 DISCLAIMERS

The CSIR has produced this EoI in good faith. However, the CSIR, its agents and its employees do not warrant its accuracy or completeness. To the extent that the CSIR is permitted by law, the CSIR will not be liable for any claim whatsoever and howsoever arising (including, without limitation, any claim in contract, negligence or otherwise) for any incorrect or misleading information contained in this EoI due to any misinterpretation of this EoI. This EoI is a request for expressions of interest only and is not an offer document; answers to it must not be construed as acceptance of an offer or imply the existence of a contract between the parties. By submission of its information, organisations shall be deemed to have satisfied themselves with and to have accepted all terms and conditions of this EoI. The CSIR makes no representation, warranty, assurance, guarantee or endorsements to any party concerning the EoI, whether with regard to its accuracy, completeness or otherwise, and the CSIR shall have no liability towards any party in connection therewith.