CIBSE

Invitation to Tender (ITT)
For professional services to the CIBSE Knowledge Management Committee

Flicker Perception and Health Responses
December 2016

Issued by:
CIBSE
222 Balham High Road
London
SW12 9BS
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1 INTRODUCTION

1.1 Background

Organisations such as LightAware are publishing anecdotal evidence for potential harm done by flickering LEDs as reported by various people. This is not a new phenomenon – it occurred with fluorescent lamps, although generally not so publicly as there was no internet in the past to circulate the complaints and concerns about a new form of lighting. With fluorescent lighting the number and severity of complaints dropped once the ballasts were changed from mains frequency to high-frequency.

Surveys and tests carried out over the years following occupants’ complaints about headaches from fluorescent lighting found that people were often complaining about the fluorescents because they were generally unhappy with the management or life at work in general and the lighting was an obvious target for their pent-up discontent. But there were indeed some people who were sensitive to mains frequency flicker from fluorescent lamps when the flicker was of a high amplitude. It is important to remember that incandescent lamps have 50Hz flicker, but the amplitude of that flicker is small. The evidence for significant effect on humans from flicker from LEDs is primarily, at present, anecdotal and little research has yet been undertaken to carry out comparative studies with a group of human subjects under controlled experimental conditions.

CIBSE/SLL recently commissioned research from Public Health England which studied a range of LED lighting products. Measurements from that report showed significant variability in the amplitude of flicker across the groups of products measured. The project did not measure the impact of that flicker on individuals.

It is also worth noting that “Wellbeing” in buildings is now a significant initiative in its own right, and so the impact of light sources on occupant satisfaction is likely to become more significant. CIBSE is seeking tenders to build on the PHE research and investigate the impact of flicker on human health and wellbeing.

1.2 Outline Requirements

The scope of the proposed work is described in Section 2 and tender instructions are provided in Section 5.

The proposed work is relevant to a range of CIBSE/SLL publications. These include:
- Human Responses to Lighting based on LED Lighting Solutions CRCE-RDD 01-2016
- SLL Code for Lighting
- SLL Lighting Handbook
- SLL Lighting Guide LG7 Office Lighting
- Guide A Environmental Design (which explicitly refers to flicker in Chapter 8)

2 SPECIFICATION

2.1 Project aim

The project will aim to confirm whether people of a range of ages are affected adversely by flicker from modern LED lamps, which are fully compliant with the highest current standards, and compare the reaction of these users to tungsten lighting as the base case.
2.2 Expected approach

It is expected that the successful tender will undertake a series of controlled experiments with men and women of a range of ages – not just young students. These participants will be checked for colour blindness and to confirm that they have had a recent vision test and are wearing their appropriate glasses/contact lenses for the test.

Participants will not be told the specific nature of the trials but will be told that the purpose of the experiment is to do with the tests they will carry out in the test room.

Participants should be briefed in a separate room where they can adapt to a lighting level similar to that in the adjacent test room. Once in the test room they will carry out a standard set of tasks whilst under one of four visually identical, diffuse, light sources. These are proposed to be

1. DC driven incandescent giving ‘no’ flicker
2. Normal mains incandescent to give a baseline low amplitude mains flicker that few people report problems with
3. LEDs with high-frequency drivers with low amplitude flicker
4. LEDs with high-frequency drivers with a higher amplitude flicker

The lights will be filtered as necessary to provide a similar colour appearance.

There will be two measures for each participant – an objective score from the test carried out in the test room and a subjective survey of their response to the lighting. The subjective response will be answers to a series of standard questions about various aspects of the room. These questions will help mask the actual main questions of the trial, which will be along the lines of ‘steadiness of the light’ and perhaps ‘did you notice any disturbances’ with flicker being a possible response among other listed disturbances.

The data from the trial studies will break down the test scores and subjective scores by lighting type and by age and sex.

The key deliverable is to seek to provide conclusive evidence of the impact of flicker from LED lighting from controlled experiments which eliminate the potential for invalid conclusions based on poorly designed tests. It demonstrates the ability of CIBSE and SLL to respond and provide evidence to address lighting issues which have major impacts on the general population, and the results will also be relevant to the growing interest in “health and wellbeing” in non-domestic buildings.

3 PROJECT MANAGEMENT

It is intended to let a contract for work to begin in February 2017. The successful contractor will be required to produce preliminary drafts for review by the Steering Group, along with a final report. In addition to the report produced for CIBSE/SLL the contract will require a paper or papers be prepared for submission to Lighting Research & Technology (LR&T).

The project will be managed by a Steering Group appointed by the Technical and Publications Committee of the Society of Light and Lighting on behalf of the CIBSE Knowledge Management Committee (KMC). The project will be overseen by the CIBSE Research Manager, Dr Anastasia Mylona.

4 TIMESCALES, COSTS & DELIVERABLES

Each submission should identify the work it covers and give an outline of the proposed approach to the research and a synopsis of the expected work required, as well as an outline of the intended reporting at preliminary and final stages, proposed papers for LR&T and any proposed contribution to CIBSE/SLL guidance.
The proposal should set out the proposed approach, with a CV for each participant setting out relevant information regarding the experience of the proposer, including any previous experience of working on industry guidance, including for CIBSE/SLL.

Submissions should be costed, identify and quantify any in-kind contributions offered by the proposer. A proposed timetable and fee schedule for the work indicating anticipated milestones and the months in which they will be delivered and invoiced should be included, based on work starting in February 2017.

Allowance should be made in the timetable and costs for an appropriate level of engagement with the Steering Group, which will be undertaken by correspondence as far as possible.

The successful proposal, subject to any modifications which may be agreed prior to the award of contract, will form the basis for the research agreement. The standard CIBSE Research Agreement, standard terms and conditions and contracts procedure note are included at Annex A – C.

5 TENDER INSTRUCTIONS TO CONTRACTORS

Interested parties should provide fully costed tenders addressed to Dr Anastasia Mylona (CIBSE Research Manager) by email, by noon on 15th January 2017. Should you have any questions regarding this ITT then please contact Dr Mylona, amylona@cibse.org

The tender process will follow the timescales below:

<table>
<thead>
<tr>
<th>Item</th>
<th>By when</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITT sent out</td>
<td>07/12/2016</td>
</tr>
<tr>
<td>Deadline for tender return</td>
<td>15/01/2017</td>
</tr>
<tr>
<td>Successful contractor appointed by</td>
<td>31/01/2017</td>
</tr>
<tr>
<td>Kick off meeting</td>
<td>February 2017</td>
</tr>
</tbody>
</table>

Requests for clarifications of the ITT documents must be made in writing, preferably by email, not later than midday on 15th January 2017. If CIBSE needs to issue any additions or clarification to these documents during the bidding period, we will do so in writing (usually by email) and send this to all those who have expressed an intention to submit proposals. Your organisation must bear all costs associated with the bidding process itself.

CIBSE shall be under no obligation to award a contract for all or any part of the requirement set out in this Invitation to Tender, to any supplier or at all. **We would be grateful if you could inform us as soon as possible whether or not you intend to submit a tender.** If you later decide not to respond to this ITT, please let us know in writing as soon as possible, giving brief reasons.

6 FORMAT OF TENDER RETURN

**Tender Response:** Please submit 1 electronic copy and 2 hard copies of your tender response, most business file types are acceptable. All information in this ITT document set shall be treated as confidential. Tenders should show firm lump sum prices (including expenses but exclusive of VAT) in sterling for the services offered.

Submissions shall be addressed to The Research Manager, CIBSE, 222, Balham High Rd. London, SW12 9BS

The supplier shall submit a detailed proposal describing:

- The scope of work offered, amplifying on the tasks identified above and including any others not specified which the Contractor considers necessary
• A project plan with milestone deliverables, including and delivery dates and costs
• A schedule of staff time and individual day rates used to determine the prices for each of the deliverables
• The experience of the organisation in this type of work
• The proposed project team and their individual experience
• Details of how the project would be managed and monitored and risks assessed and mitigated
• Description of previous case studies and names of referees from similar projects.

7 ASSESSMENT CRITERIA

The supplier will be selected on an evaluation of their submission, which will include price, quality and experience in undertaking this type of project.

The relative weightings for the evaluation of submissions are as follows:

- Understanding of the brief 20%
- Relevant experience & track record 20%
- Technical ability and suitability 50%
- Overall quality of bid 10%

Each aspect will be scored on a scale of 1-10. CIBSE reserve the right to invite candidates for interview if necessary.

8 TERMS AND CONDITIONS

The contract will be let under the draft agreement at Annex A. Terms and Conditions will be in accordance with the CIBSE standard terms at Annex B. The requirements of the Contracts Procedure Note will also apply, in particular the conditions relating to publicity for the research. Should any clauses be unacceptable to the supplier this must be noted in the tender submission and alterations proposed. Annex B sets out the procedures relevant to the conduct of the contract.