UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Masonry Arch Bridges,

Faculty of Engineering & Physical Sciences

Salary: Grade 7 (£33,797 – £40,322 p.a.)

Reference: EPSCV1012

Closing date: 26 January 2020

Fixed term for up to 3 years, available from the 1st February 2020, to end by 28 February 2023

We will consider flexible working arrangements

Research Fellow in Masonry Arch Bridges
School of Civil Engineering

Are you an ambitious researcher looking for a new challenge? Do you have expertise in experimental structural engineering, especially in the testing of large-scale masonry structures or similar? Do you want to further your career by making an important contribution to this ambitious and exciting research project with the opportunity to work with leading researchers and bridge owners in the UK? Do you want to help with the development of bridge assessment guides that take into account the real behaviour of masonry arch bridges?

Although approaching 50% of bridge spans on the UK rail and regional highway networks are of masonry arch construction, our understanding of their fundamental behaviour remains limited, and the modelling approaches used by engineers when assessing the strength and in-service performance of such bridges are not capable of capturing real-world behaviour. This means that bridges are being needlessly damaged, strengthened and/or demolished, at significant and growing cost to the nation. To help address this a team of researchers from the University of Leeds, Imperial College London and the University of Sheffield has been awarded EPSRC research funding totalling £1.85M for a project titled "***Exploiting the resilience of masonry arch bridge infrastructure: a 3D multi-level modelling framework***".

Working with bridge owners and their consultants, the team will undertake an integrated programme of experimental and numerical modelling work to greatly improve our understanding of masonry arch bridge behaviour and to provide practitioners with a powerful suite of modelling tools and a robust 3D multi-level modelling framework. A key part of this work, known as Work Package 1b, to be carried out at the University of Leeds, is to test six different large-scale (3m span) clay brick arch bridges in the laboratory. Each bridge (consisting of a brickwork arch, abutments, wingwalls, spandrels and either limestone or clay backfill) will be subjected to an array of cyclic concentrated loads applied over a continuous period of one month.

Detailed measurements of the response of each bridge to the applied load will be recorded using digital image correlation and other equipment. The data, together with the results from smaller-scale testing undertaken at Sheffield, will be used by the Imperial College team in the development of a high fidelity finite element model. The

Leeds team will also carry out additional testing of masonry samples to facilitate material parameter identification; this is known as Work Package 1c.

Although you will be based at the University of Leeds you will also work closely with the research teams at Imperial College London and the University of Sheffield. You will attend regular research team meetings and steering group meetings (with the project's industrial partners) in London and Sheffield.

Support will be provided for you to achieve some of the Institution of Structural Engineers (IStructE) core training objectives (as defined in the IStructE's research and development route) with a view to assisting you to move towards achieving chartered engineer status.

What does the role entail?

As a Research Fellow, your main duties will include:

- Generating and pursuing independent and original research ideas in the area of masonry arch bridges and similar structures;
- Developing research objectives and proposals and contributing to setting the direction of future research projects and teams including preparing proposals for funding in collaboration with colleagues;
- Take a lead role in supervising the construction the six large-scale bridges and the material parameter identification tests to ensure that a consistently high standard of construction (including the density of the compacted backfill) is achieved. Such work includes the construction of the arch bridge test bed;
- Assist the Leeds Team in the production of detailed drawings of the six test bridges and material identification test specimens;
- Assist with the design, specification, installation and operation of measurement and instrumentation systems plus data recording and management systems that are appropriate to the research project;
- Evaluating methods and techniques used and results obtained by other researchers in similar fields and relating such evaluations appropriately to your own work;
- Leading the preparation of papers for publication in leading international journals and disseminating research results through other recognised forms of output;

- Participating in dissemination and knowledge transfer events, conferences, project meetings and workshops, including presenting and discussing your own research and that of the team;
- Working both independently and also as part of a larger team of researchers and industrial partners in the UK and internationally;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

What will you bring to the role?

As a Research Fellow, you will have:

- A PhD (or you will have submitted your thesis before taking up the role) in structural engineering or a closely allied discipline;
- A strong background in structural engineering;
- Experience of large-scale experimental testing in a laboratory environment (or similar) and the associated instrumentation and data collection and management techniques;
- Good time management and planning skills, with the ability to meet tight deadlines and work effectively under pressure;
- A proven track record of peer-reviewed publications in high impact factor journals;
- Excellent written and verbal communication skills including presentation skills;
- Proven ability to manage competing demands effectively, responsibly and without close support;
- A proven ability to work well both individually and in a team;
- A strong commitment to your own continuous professional development.

You may also have:

- Knowledge and experience of bridge engineering and masonry structures;
- Experience of digital image correlation techniques;


- Working in a multi-disciplinary environment;
- Experience of pursuing external funding to support research.

How to apply

You can apply for this role online; more guidance can be found on our How to Apply information page. Applications should be submitted by **23.59** (UK time) on the advertised closing date.

Contact information

To explore the post further or for any queries you may have, please contact:

Steve Garrity, Hoffman Wood Professor of Architectural Engineering
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Email: S.W.Garrity@leeds.ac.uk

Additional information

Faculty and School Information
Further information is available on the research and teaching activities of the Faculty of Engineering and Physical Sciences and the School of Civil Engineering.

A diverse workforce

The Schools in the Faculty of Engineering & Physical Sciences are proud to have been awarded the Athena SWAN Bronze or Silver Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our equality and inclusion webpage provides more information.

Working at Leeds
Find out more about the benefits of working at the University and what it is like to live and work in the Leeds area on our Working at Leeds information page.

Candidates with disabilities
Information for candidates with disabilities, impairments or health conditions, including requesting alternative formats, can be found on our Accessibility information page or by getting in touch with us at disclosure@leeds.ac.uk.

Criminal record information

Rehabilitation of Offenders Act 1974

A criminal record check is not required for this position. However, all applicants will be required to declare if they have any ‘unspent’ criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our Criminal Records information page.