



Safer Complex Systems

Call for Case Studies

**Applicant Guidance Notes
(Stage One: Call for Abstracts)**

Contents

Introduction	3
Mission, Objectives and Scope	4
Process Overview	6
Eligibility and Boundary Criteria	7
How to apply	8
Completing the online form	9
Expression of Interest Form Overview	10
Assessment of Applications	15

Introduction

Introduction to the Royal Academy of Engineering & Lloyd's Register Foundation

The Royal Academy of Engineering is the UK's national academy for engineering and brings together the most successful and talented individuals and organisations, from across the engineering sectors and beyond, to advance and promote excellence in engineering for the benefit of society.

The Lloyd's Register Foundation is an independent global charity that helps to protect life and property at sea, on land, and in the air. The Foundation has partnered with the Academy to build on the Academy's network of global alliances to tackle the most pressing engineering safety and sustainability problems and develop these into practical and accessible outputs for the engineering profession and affected communities.

Safer Complex Systems Programme

All around the world people rely on critical infrastructures to survive, stay safe and maintain a good quality of life. Much of this infrastructure, for example food and water supply, healthcare, housing, transportation and communication, is made up of complex systems.

The Academy and Lloyd's Register Foundation (LRF) have launched a £5 million, 5-year programme, Safer Complex Systems, to increase safety in the design, management and governance of complex systems. The programme will achieve this by supporting the most impactful interventions where they are most needed, globally.

The Safer Complex Systems programme is governed through a board chaired by Dame Judith Hackitt DBE FREng, former Chair of the Health and Safety Executive and leader of the UK Government's Independent Review on Building a Safer Future conducted after the tragic Grenfell Tower fire in London.

Mission, Objectives and Scope

Mission

This programme will develop and implement practical solutions to improve the safety of complex systems.

Objectives

1. To deliver new, practical solutions that increase safety in the design, management and governance of complex systems
2. To build a diverse, multisector community on complex systems globally
3. To engage with members of the public to improve their understanding of critical safety challenges and to communicate their role and responsibilities within a system to support them to become part of an effective solution

Scope: What do we mean by a complex system?

It is difficult to define a complex system, but what we do know is that we're not talking about traditional systems engineering, we're talking about systems of systems, where systems overlap and influence one another to have a positive or negative impact on the big things that happen in the world.

The Academy will not prioritise the following case studies as they are already well-articulated, are relatively self-contained and have existing solutions:

- Areas of engineering with well-established safety practices (e.g. aviation, nuclear)
- Discrete examples of systems engineering (e.g. successfully functioning power stations)
- Examples of traditional systems engineering (e.g. where everything cascades neatly into one single authority)

Complex systems with similar characteristics to those listed below are of particular relevance to this programme:

1. Complicated governance, for example:

- Systems that evolve rather than being structured or planned in advance, which creates the need to wrap responsibilities around things retrospectively. In examples like this, there is no one person in charge of overseeing the system.
- Lack of autonomy over a different system that impacts the performance of the system you are trying to improve
- Absence or weakness of a regulatory control (e.g. Grenfell Tower fire, UK)

2. Interdependency and interconnectivity of systems, for example:

- Many different systems are plugged into the same infrastructure system (e.g. Lancaster flooding in UK and resultant loss of electricity)
- One system being wholly reliant on performance of another system (e.g. the UK ambulance service relying wholly on GPS)
- Multiple system upgrades over time resulting in multi-layered complexity

3. Stakeholder communication and participation, for example:

- Are voices of all effected stakeholders and communities being listened to?
- How well do community representatives mix with and acknowledge the views of experts? (e.g. examining the public understanding of risk vs. actual risk)
- Multiple stakeholders with different perspectives, different agendas and unaligned interests

4. Examining how context impacts success in approaches, for example:

- Why do the same approaches, methods and actors have different levels of success in different contexts?
- What can we learn from the underlying principles of successful approaches?
- How do we build on a systems approach and/or systems thinking to make them more effective and more applicable to a wider set of contexts?

The following reports have informed this programme and the above characteristics:

- [Building a Safer Future](#)
- [Living without Electricity](#)
- [Engineering Better Care](#)

Process Overview

Process

This is a **two-stage application process**.

Step 1: Call for Abstracts (September – November 2019)

Please submit a high-level summary of a case study of a complex system located anywhere globally that you think it is important for the rest of the global community to be aware of and to learn from.

All Abstracts will then be reviewed by the Programme Board and external reviewers within the Academy's trusted community.

Step 2: From the submitted Abstracts, the Academy will select the case studies they believe will be most helpful to a diverse, global community. If required, the Academy will provide funding to develop the Abstract into a full piece of research, to produce a full case study. The Academy will publish the final case studies both online and offline. There may also be opportunities to develop the case studies into creative resources (e.g. films, animations, media articles, interactive tools, and/or documentaries).

Deadline

Call for Abstracts: **11 November 2019**

Full case study: **December 2019 – April 2020 (Exact date TBC)**

Role of the Academy

The Academy shall play a proactive role in assisting applicants to develop their ideas, offering to connect participants and wider stakeholders where we see interests align, and suggesting ideas to applicants if gaps across the portfolio of project applications are evident.

Eligibility and Boundary Criteria

- ❖ This is a completely open call globally. We particularly encourage applications from academia and industry.
- ❖ Applications must be submitted by a Lead individual who agrees to be responsible for the development of the case study if successful
- ❖ If there are multiple partners involved in the case study development, all partners must agree to being involved with the application, agree upon the workplan and commit to fulfilling their part through the course of the case study development

How to apply

Applications can only be submitted by a suitably empowered representative from the lead organisation. Where applicable, the lead organisation will act on behalf of and in consultation with all partners. All correspondence from the Academy will be sent to the lead organisation.

All applications must be submitted via the Academy's online Grants Management System (GMS): <https://grants.raeng.org.uk>. The author must first register with the system and provide some basic log-in details to create a profile.

The application form has five sections and should take approximately 2 hours to complete.

The primary purpose of this Call for Abstracts is to identify whether the proposed project meets the objectives of the Call for Case Studies and the wider programme.

You will have the option to download a pdf of your application after submission, which may be useful for future reference and for passing on to your colleagues.

Please note that lead applicants will need to obtain a letter of support from their Senior Management.

If you have any questions concerning the online application system, please email Shelley Stromdale at shelley.stromdale@raeng.org.uk

Completing the online form

After logging in to the system via the Academy website and selecting the Safer Complex Systems programme you will be presented with the Instructions screen. Here you will see some general instructions on how to use the system as well as the below list of sections of the application form:

- ❖ Case Study Details
- ❖ Applicant(s) and Organisation(s) Contact Details
- ❖ Abstract Content
- ❖ Your Support Needs
- ❖ Project Lead Declaration

At any stage in the application process you can save your work and return to it later. You can answer the questions in any order and you may freely skip some sections to return to later if you so wish. It is therefore advised to view the application early on for an indication of what is required.

Expression of Interest Form Overview

Section 1 - Case Study Details

1. Please give the title of your proposed case study.
Please state the name of the complex system in your case study (e.g. the health system in Kenya)
2. Please give a brief description of the complex system(s) in your proposed case study and include the key characteristics that make it a complex system.
See page 5 of these Guidance Notes for examples of some key characteristics you may wish to consider.
3. Please list the countries related to your proposed case study. If your proposed case study spans international boundaries please indicate the affected region(s) and outline the country or region that your proposed case study will primarily focus on:
Please list the countries linked to the complex system in your case study (e.g. Southeast Asia with a primary focus in Cambodia)
4. Please provide keywords relating to your proposed case study as this will help us to identify suitable reviewers:
Please provide keywords relating to your case study (e.g. food, safety, sustainability, circular economy, health, AI)

Section 2 - Applicant(s) and Organisation(s) Contact Details

1. Lead Contact Details
The application form should be submitted by the Project Lead who agrees to be responsible for the direction and coordination of the project and partnerships if funded. Please note that the Project Lead will act on behalf of and in consultation with all co-applicants. All correspondence will be sent to the Project Lead. Project Lead details should be automatically generated by the system, as you provided these at registration, but you will need to add in the details of other participants and their employing organisations. If you do update any of your details please also update them in the "My Information" tab.
2. Please provide contact details of Co-Applicants
Please provide the name and contact details of all individuals and their organisations who will be involved in this Call for Case Studies.

Section 3 - Abstract Content

1. Please indicate if your proposed case study contains the following:
 - a successful system (highlighting strengths to inform good practice
Please select this if your case study focusses on a successful case and good practice (e.g. the aviation sector having a no blame culture that results in transparency after mistakes, which leads to continued improvements to practice and increased safety in the sector)
 - a failure case (highlighting weaknesses to inform lessons learned)
Please select this if your case study focusses on a failure case and lessons learned from failure (e.g. The Grenfell Tower fire in London, UK, which highlighted that regulation within the construction industry that was not fit-for-purpose and allowed unsafe high-rise buildings to be built)
 - both (success/strengths AND failure/weaknesses)
Please select this if your case study focusses on both failure/weaknesses and success/strengths
2. What happened? Please give a brief summary of the events (positive or negative) that you will discuss in your proposed case study.
Please provide information of the main points of your case study and highlight why it is relevant to the Safer Complex Systems Programme.
3. Please give a brief overview of the consequences (positive and/or negative) of the above events on the safety of people and property.
Please consider consequences relating to safety in the following areas:
 - political
 - economic
 - social
 - technological
 - legal
 - environmentalPlease provide information about the consequences of the events featured in your case study. At all times, please highlight the impact of the consequences on the safety of people and property.
4. If applicable, do you foresee any emerging issues or trends that will impact the scale and nature of the safety challenges highlighted in the complex system(s) included in your proposed case study? Please consider emerging issues that will determine the future context that we will be working in the next 10-20 years. How will these issues impact the safety challenges highlighted in your previous answers?
This is an optional question – please write 'Not Applicable' if you don't wish to provide an answer.

5. If applicable, please give a brief description of the STRENGTHS in the design, management and/or governance of the complex system in your proposed case study (to inform good practice). Please consider how these strengths relate to the local context of the complex system. Please highlight the strength(s) of the complex system in your case study to inform good practice (e.g. the aviation sector having a no blame culture that results in transparency after mistakes, which leads to continued improvements to practice and increased safety in the sector). Please try to highlight how the strength(s) link to the local context to identify the underlying principles of why the approach has been successful in its context.
6. If applicable, please give a brief description of the WEAKNESSES in the design, management and/or governance of the complex system in your proposed case study (to inform lessons learned). Please consider how these weaknesses relate to the local context of the complex system. Please highlight the weakness(es) of the complex system in your case study to inform lessons learned (e.g. The Grenfell Tower fire in London, UK, which highlighted that regulation within the construction industry that was not fit-for-purpose and allowed unsafe high-rise buildings to be built). Please try to highlight how the weakness(es) link to the local context to identify the underlying principles of why the approach has been successful in its context.
7. Please give a brief description of the lessons learned from your proposed case study. What learning would be helpful to share with a global audience to enable them to increase the safety of their approach to the design, management and governance of complex systems? Please indicate the key lessons from your case study that could be shared with the wider community to increase safety of practice in the design, management and governance of complex systems.
8. If applicable, what improvements to practice have been made as a result of your proposed case study? If applicable, please indicate how your case study has resulted in improvements to practice that have increased safety in the design, management and governance of complex systems.
9. If your Abstract is successful and is developed, published and shared widely, what communities or group(s) would learn from the content of your proposed case study? How do you think it would benefit them if this knowledge was disseminated? Please think as broadly as possible as this programme wishes to engage a diverse, multisector, global audience.

Please indicate how the content of your case study will benefit the wider community. Tell us who your target audience is and how your case study will lead to increased safety in their approach to the design, management and governance of complex systems. Please think as broadly as possible: all countries, all sectors, all academic disciplines, and all types of stakeholder.

10. Please list the key actors/stakeholders (organisations or individuals) related to your proposed case study.

Please list all of the key actors, organisations and individuals, related to the complex system in your proposed case study. Please expand all acronyms. Please provide a contact email or website URL wherever possible to avoid confusion. For 'Stakeholder Type' please select from the following list:

- Academia (engineering)
- Academia (non-engineering)
- Industry
- Government/Policy maker
- Regulator
- NGO/Not for Profit
- Research Institute/Research Consultant
- Other - please give details

11. If available, please enter the URL of existing online resources to:
- support our understanding of your proposed case study
 - highlight existing creative tools (films, animations etc.) that can be used to communicate the safety challenges, good practice and/or lessons learned from your proposed case study

If they exist, please link us to online resources relating to your case study. This is to inform how we may be able to communicate the case study in the future.

12. Please tick the checkbox if you would like to become part of the Safer Complex Systems community and receive updates about future opportunities related to this programme.
Please select this box if you would like us to add you to our community and provide updates about opportunities relating to this programme.

Section 4 - Your Support Needs

1. The Academy will invite successful submissions to develop a full, well-evidenced case study of approximately 8000 words by April 2020 at the latest. At this stage, funding may be available from the Academy to enable this to happen. If selected, please briefly indicate what additional funding would you need to be able to develop this abstract into a full case study?

Please provide a high-level indication of the level of funding support you will need to develop your Abstract into a full case study. If you will require funding, please give an indicative budget and time frame for your funding request and a brief narrative explanation of all costs you are requesting that the Academy's grant cover, including both what the funds will be spent on and why. Please note successful applicants will be asked to provide more detailed information around funding in stage two of the process.

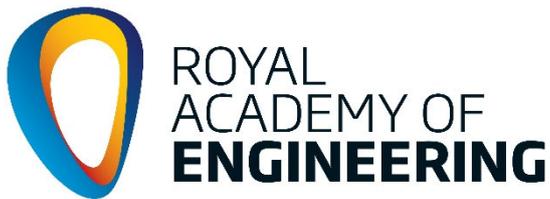
Section 5 - Project Lead Declaration

1. Please enter your Name, Job Title and Organisation:
Please enter the above if you agree with the Declaration.
2. By ticking this checkbox I agree to be bound by the conditions for this scheme.
Please check this box if you agree to the condition schemes.

Assessment of Applications

All applications will be assessed against the following criteria:

- ❖ **Case Study Details and Abstract Content;** the alignment and relevance of the proposed Case Study with the Programme's aims and goal; the fit and coverage within the Academy's portfolio
- ❖ **The potential of the included good practice and lessons learned to inform improvements in future safety practice to save lives;** the potential for sustained benefit and impact with respect to: the applicants; the organisations directly involved; the wider engineering community within the project implementation countries; and the wider international community.
- ❖ **Well-evidenced analysis of the case study;** the degree to which the case study is well evidenced, holistic and robust enough to be developed into materials which can credibly inform safety-improving policy and practice.



**Thank you for your interest in this
Call for Case Studies.**

Call for Abstracts deadline: 11 November 2019

**We look forward to receiving your
application.**

For more information on the Safer Complex Systems programme, please
visit www.raeng.org.uk/safer-complex-systems

If you have any questions please contact Shelley Stromdale,
Programme Officer for the Safer Complex Systems programme.

shelley.stromdale@raeng.org.uk

+44 (0) 20 7766 0794