

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Feb 2014

Project Reference Number

NIA_SGN0046

Project Registration

Project Title

Cotter Plate Identification and Remediation (Stage 1)

Project Reference Number

NIA_SGN0046

Project Licensee(s)

SGN

Project Start

March 2014

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Oliver Machan, Innovation Project Manager

Project Budget

£13,332.00

Summary

The scope of this project is to work in partnership with specialist GIS data suppliers, who will use their own resources in combination with network maps provided by SGN to identify five trial areas (expected to be 2km x 2km) in SGN's Scotland and/or Southern licence areas where mains are likely to have been sealed using Cotter plates. These areas will then be used during the Stage 2 project to confirm the location of Cotter Plates. This will involve refining a methodology (2 months) and producing an output of trial areas that are highly likely to contain Cotter Plates (1 month). Once complete we will be able to assess the benefits of using the information generated throughout the trial.

<p

The proposed methodology is to utilise photo maps compiled from war time aerial imagery and bomb maps where available to identify bomb damaged buildings throughout SGN's Scotland and Southern licence areas. Where the photo maps are inadequate to identify bomb damaged buildings, a combination of the summary bomb maps and individual reconnaissance photos will be used. A GIS polygon map will be created, with polygons covering blocks of buildings that have the same bomb damage severity classification. The existence of bomb damage will be collected as an attribute code to the polygons. Trial areas will be identified based on the coincidence of bomb damage and gas mains.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Over the years Scotia Gas Networks (SGN) has seen many changes in the types of materials used in the construction of its distribution networks and the way in which it is maintained. This project addresses problems associated with a specific piece of equipment previously used in operations to isolate part of the live gas network, a necessary step when repairs or modifications are required. The piece of equipment is a 'Cotter Plate' (sometimes referred to as a 'Cottel' Plate), and was used up to the early 1950s, particularly during WWII. When isolating a gas main, a hole is made in the main. A Cotter plate would be locked to the chiselled hole, as a method of re-sealing the gas main.

Although fit for purpose at the time of use, the engineering has not aged well and fatigue of the clamp and corrosion has resulted in leakage at the Cotter plate contacts. This problem has been identified as a result of finding corroded Cotter plates when responding to public reported escapes. However, it is not possible to proactively identify Cotter plates, assess risk of failure and remediate where appropriate because there are no records of these assets' locations.

As a result, the objective of this project is to firstly undertake a study to determine the potential location of these plates throughout our network. Future work may then be carried out to investigate the reliability of the method of locating Cotter plates, their condition and develop a cost effective methodology for remediation of the seal failure over external encapsulation.

Method(s)

This project represents Stage 1 of a three stage programme to develop a Method of locating and remediating Cotter plates:

- Stage 1: Develop a method to identify likely Cotter Plate locations and create an output of trial areas to support Stage 2.
- Stage 2: Internally inspect the identified locations for evidence of Cotter Plates.
- Stage 3: Develop and test a more cost effective methodology for remediation over encapsulation.

Stage 1 Method Overview

Since Cotter plates were mainly used during WWII, to rapidly repair bomb damage to gas mains, it is believed that bomb damage to buildings can indicate areas where large diameter gas mains may have been damaged and subsequently repaired with a Cotter Plate.

Very little bomb damage to buildings was repaired during the war. Buildings which were bomb damaged during the war can be identified and where the detail exists, a distinction between highly damaged and less damaged can be drawn. Secondly, new structures which replaced badly bomb damaged buildings can be identified, with the inference that the gas mains were also damaged and possibly repaired.

The Method trialed in this project will be use of bomb maps and historic aerial imagery (compiled by the project supplier) combined with SGN's maps of network infrastructure in existence during WWII to create a GIS map of likely Cotter plate locations, based on proximity of gas mains to bomb damaged buildings.

Scope

The scope of this project is to work in partnership with specialist GIS data suppliers, who will use their own resources in combination with network maps provided by SGN to identify five trial areas (expected to be 2km x 2km) in SGN's Scotland and/or Southern license areas where mains are likely to have been sealed using Cotter plates. These areas will then be used during the Stage 2 project to confirm the location of Cotter Plates. This will involve refining a methodology (2 months) and producing an output of trial areas that are highly likely to contain Cotter Plates (1 month). Once complete we will be able to assess the benefits of using the information generated throughout the trial.

The proposed methodology is to utilise photo maps compiled from war time aerial imagery and bomb maps where available to identify bomb damaged buildings throughout SGN's Scotland and Southern licence areas. Where the photo maps are inadequate to identify bomb damaged buildings, a combination of the summary bomb maps and individual reconnaissance photos will be used. A GIS polygon map will be created, with polygons covering blocks of buildings that have the same bomb damage severity classification. The existence of bomb damage will be collected as an attribute code to the polygons. Trial areas will be identified based on the coincidence of bomb damage and gas mains.

Objective(s)

The objectives of this project are to:

- Develop and refine a method to identify likely Cotter Plate locations
- Create a shape file (GIS) output of trial areas in support of Stage 2

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The key success criteria will be:

- Part 1: Polygon map created covering blocks of buildings that have the same classification - existence of bomb damage collected as an attribute code to the polygons.
- Part 2: Five trial areas of 2km x 2km agreed by both parties selected for Stage 2.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

In order to ensure that learning associated with this project is maximised and that the future application of this methodology is well understood, it is necessary to make sure the Stage 1 outputs are representative of network locations in Scotland and South England. Both licence areas will therefore be reviewed in order to identify five representative 2km x 2km areas, selected based on criteria defined by the methodology. This is a small scale project to refine the Method of identifying potential Cotter plate locations only, avoiding expenditure on further stages until this is established.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

This project will cover SGN's entire Scotland and Southern England license areas.

Revenue Allowed for the RIIO Settlement

While no savings are expected during project implementation, it is expected that if successful the project outcomes will provide Network Licensees with an opportunity to reduce costs associated with Cotter Plate remediation using the new methodology and processes developed in the later stages.

Indicative Total NIA Project Expenditure

The total project expenditure will be £13,332, 90% of which (£11,999) is allowable NIA expenditure.

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

The introduction of this newly developed methodology has the potential to deliver financial savings associated with remediation of Cotter plates, as there is currently no method of identifying these assets in order to proactively remediate them and avoid leakage and public reported escapes, if successful outputs are achieved. We spend a vast amount of time and resource each year in both Network licence areas responding to and remediating public reported escapes, which may be caused by Cotter plate failure. This project is the initial step in developing and utilising a new methodology regarding Cotter Plate remediation, with the aim of greatly reducing that cost and minimising the risks of the ongoing activity.

Please provide a calculation of the expected benefits the Solution

N/A. This is a research project.

Please provide an estimate of how replicable the Method is across GB

All Network Licensees are likely to have Cotter Plates as part of their distribution networks. Depending on the scale of implementation required for each network, it is anticipated this methodology and the learning from the project could be applied to a high proportion of infrastructure operated by the other Network Licensees. This is based on an assumption that National Grid, Wales & West Utilities and Northern Gas Networks all used similar engineering processes in the past when isolating parts of the distribution network .

The project outcomes may show that applicability of the Method varies from network to network. The main focus of this project is to test the methodology and understand the potential benefits (all stages).

Please provide an outline of the costs of rolling out the Method across GB.

Until the method is developed and tested fully it is difficult to determine an accurate price for the roll out of the method. Further development through this project will enable assessment of the cost of the technology and costs associated with its deployment.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

- A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).
- A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)
- A specific novel operational practice directly related to the operation of the Network Licensees system
- A specific novel commercial arrangement

RIIO-2 Projects

- A specific piece of new equipment (including monitoring, control and communications systems and software)
- A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

The results from output methods will be shared with the other Network Licensees by the production of a technical report, demonstration of the management system and practical demonstration if required once all stages are complete. If proven to be a success this will allow Network Licensees to introduce this methodology into their networks and enable them to begin proactively identifying likely Cotter Plate locations across their networks.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

- Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

n/a

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

n/a

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

n/a

This project has been approved by a senior member of staff

Yes