

NIA Project Registration and PEA Document

Date of Submission

Jun 2017

Project Reference Number

NIA_CAD0004

Project Registration

Project Title

Bonded Saddle for Temporary Mains Access

Project Reference Number

NIA_CAD0004

Project Licensee(s)

Cadent

Project Start

June 2017

Project Duration

1 year and 9 months

Nominated Project Contact(s)

Satwant Sarkaria (Project Manager) & Andrew Newton (Portfolio Manager)

Project Budget

£238,963.00

Summary

- Performance criteria required for qualification of the 'bonded saddle'.
- Laboratory testing and assessment in accordance with performance criteria.
- A G23 field trial procedure.
- Field trial witness / evaluation and report.
- Develop Manufacturers Specification

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Gaining access in to the gas network, for a range of requirements, this could be for new installations, replacement of existing fittings or access for other techniques typically requires full circumferential exposure of the host main to enable chains to hold the equipment in place and access the main under no gas conditions. On smaller diameter mains found in the HSE 'Tier 1 and 2' range, the excavation size and subsequent costs are not of major significance. However, mains falling in to the Tier 3 range, typically 18 inch and above, can involve large excavation works that are expensive and time consuming.

Method(s)

Further advancing the ALH Bond and Bolt technique and adapting the principal to deliver a bond only system for drilling saddle attachment for temporary mains access will speed up the process and enable operations to drill, tap and install new fittings along with the ability to remove an existing fitting where required leading to reduced excavation and increased safety.

There is also the potential longer term, for a wider range of uses, however this may require further development.

ROSEN UK (ROSEN) will support Cadent with qualification of the bonded drilling saddles for drilling and tapping operations. This would allow threaded fittings to be installed on gas pipelines (for the range of operations described above) as a permanent fixture with only a small excavation.

The 'bolt and bond' saddles are currently used to perform flow stop operations. Following the completion of the flow stop operation the 'bolt and bond' saddle is capped and remains as a permanent fitting on the gas pipeline.

Cadent Gas Ltd. (Cadent) propose to apply the bonded drilling saddle technique to support additional maintenance activities including:

- Insertion and/or removal of fittings.
- Repair Activities
- Small Diameter Connections
- Rider bypass during MP valve remediation
- Pressure points

It is proposed that a drilling machine is fitted to the saddle to enable the gas pipeline to be drilled and tapped so that a threaded fitting to be permanently attached. In this scenario there is no requirement for the saddle to be a permanent fitting and therefore a 'bonded drilling saddle' (i.e. without bolts) development is proposed, thus removing the requirement to tap and insert the bolts.

Scope

- Performance criteria required for qualification of the 'bonded saddle'.
- Laboratory testing and assessment in accordance with performance criteria.
- A G23 field trial procedure.
- Field trial witness / evaluation and report.
- Develop Manufacturers Specification

Objective(s)

Define product performance criteria – to include:

- Enable access into the gas network with reduced excavation
- Use typical tooling available to technician where possible. (i.e. effort made to avoid specialist tools)
- The bonded saddle must have connection interface for a service valve to enable drill attachment
- Saddle size must be sufficient for attaching around existing fittings for removal
- Safely enable operatives to install a range of fittings
- Enable operative to launch devices such as cameras into the main
- Consideration to the use within the Core and Vac technique
- All operations will be performed under 'no gas' condition

Laboratory testing and assessment

Testing will include:

- Tensile test
- Combined Tensile and Torsion test
- Cleavage/Peel test

Following completion of the laboratory tests, a report will be written providing the results, assessments, and recommendations. The G23 field trial procedure will be developed following successful product qualification in the laboratory.

G23 Field Trial Procedure

Consideration will be given to:

- Excavation size required
- Materials and components
- Surface Preparation
- Bond application and cure times
- Saddle, Valve, and drill assembly / disassembly
- Drilling and tapping
- Fitting removal
- Fitting insertion
- Quality Assurance

Field Trial Evaluation and report

It is proposed that ROSEN will attend three field trials which will include steel pipe and cast iron pipe, at least one of which will be part of the valve remediation programme. ROSEN will provide independent witnessing for operational assurance of the bonded saddle technology. The practical application of the G23 procedure will be witnessed, and each process evaluated and feedback provided to Cadent Gas Ltd.

Develop Manufacturers Specification

It is proposed that ROSEN will develop a manufacturers specification including type testing and batch release testing requirements.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Development of the bonded saddle to which will ultimately lead to:

- Successful product qualification of the product in the laboratory
- Successful product qualification of the product in the field

Project Partners and External Funding

Cadent Gas Limited £238,963 via NIA Funding

This project will be wholly NIA funded

Potential for New Learning

The methodology in of applying a Bonded Saddle for temporary mains access be utilised by all GDNs.

Scale of Project

Product design and development with laboratory work and assessment will be undertaken.

The project will install saddles on three field trial sites on the Cadent Gas distribution network

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The design and development work will be carried out at the ALH premises in Westbury.

Laboratory testing and assessment will be carried out at the ROSEN facility in Newcastle Upon Tyne.

Deployment of the test saddles will be on the Cadent Gas Distribution Network. The exact location for field trial is to be determined.

Revenue Allowed for the RIIO Settlement

No Revenue Allowed for in the RIIO Settlement.

Indicative Total NIA Project Expenditure

The total recoverable allowance will be 90% of the project costs for each Licensee under the Network Innovation Allowance (NIA)

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 savings for this project will be on reinstatement and excavation costs particularly on large diameter mains 14"- 48" where the full circumference would be currently exposed to fit chains for traditional drillings, whereas with the Bonded Saddle a smaller and shallower excavation is required.

Cadent Gas assumptions:

- Initial identification of applicable task types per year is the valve maintenance programme
- Year on year benefit minus the implementation costs = £229k (estimated)

Please provide a calculation of the expected benefits the Solution

The financial benefits relating to this project are estimated above

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

Each GDN could utilise the technology to access large diameter mains with a where temporary access is required with a reduced excavation and therefore reduce costs of excavation and less disruption in the public highway.

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

There are no implementation costs specific to this technique as existing tools will be used for excavation, no specialist tooling required.

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

An improved technique for accessing large diameter mains for the application of drilling, tapping or fittings.

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

Not applicable – this issue is not confined to Cadent Gas therefore please refer to i) above

- 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.

This project has not been carried out by any other Gas Transmission Group or Gas Distribution Group

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