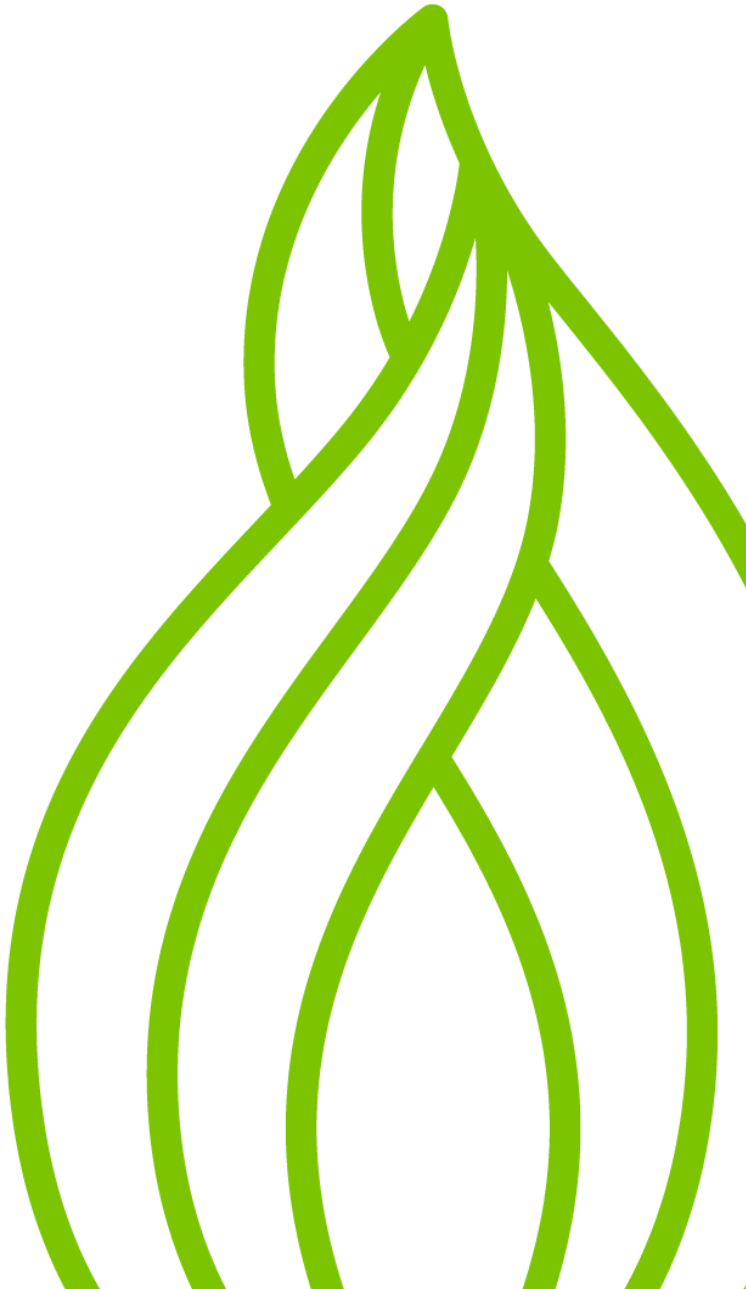
national gas transmission

# Study on Stress Concentration Factors SCF

## Value Tracking Case Study



# Study on Stress Concentration Factors SCF

## Background

One of the principal methods for making branch connections to transmission pipe work is to use a fitting generally known as Welded-in Contour Insert (WICI). These come in two distinct forms:

1. The traditional version, usually referred to by its trade name Sweepolet, which has a smooth swept transition from the edge weld into the carrier pipe through to the branch.
2. A newer design, sometimes referred to as an Insert Branch Outlet or an Insert Weldolet, is of a more compact and stockier shape but still exhibits a smooth transition but less swept.

Several the major weldolet manufacturers are now producing variations of the insert weldolet design and their adoption could potentially offer a wide range of benefits to National Gas Transmission (NGT).

## What's new?

The study has characterized the range of geometries over which the TD/12 Stress Concentration Factors (SCF) for sweepolets can be applied directly to the newer design of insert weldolet. This means that for valid range geometries the fittings can be used straight-off in a pipework stress analysis. For geometries outside of this range the SCF's in TD/12 cannot be used directly as they are non-conservative.

It has been found that the valid range of geometries covers the sizes that are most likely to be used in National Gas' transmission system. Those that lie outside of the valid range and hence have non-conservative SCF's from TD/12 can still be used, however, some additional work is required to produce acceptable SCF's; some guidance is provided to assist with this as part of the projects outputs.

## The benefits

1. Shorter Installation time, and hence reduced costs, as a result of:
- A smaller coupon needing to be removed from the carrier pipe (especially for the larger sizes)
- A shorter length of weld needed to be made to weld the fitting into the carrier pipe (especially for the larger sizes)
- Easier to perform 100% weld radiography

2. Easier to manufacture therefore anticipated to be lower cost items (estimated as £10k per annum)

3. Reduce reliance on a small number of suppliers, improving lead time and reducing vulnerability

## Implementation

The findings of the study will be incorporated into National Gas' internal document T/SP/PW/13, which is the specification for performing pipework stress analysis to requirements of IGEM/TD/12. This will then be fully briefed out to our main contractors.