

Briefing Note: BS PD 8010:2004 – Issues arising from Launch Seminar

Background

Pipeline Engineering standards are organised as:

ISO	– International	ISO 13623:2000
CEN	– European	EN 14161:2003
National	– BS for UK	BS 8010 Part 3:1993

The Vienna Agreement 1990 stipulates the following terms for technical cooperation between ISO (international standards) and CEN (European standards):

- i) With a 71% vote in favour, ISO standards are adopted as CEN standards. After two ballots ISO 13623 became EN 14161, excluding on-land gas pipelines which are covered by the existing EN 1594.
- ii) CEN international regulations require that European standards are implemented as national standards, and existing national standards covering the equivalent scope are withdrawn. EN 14161 was published as BS EN 14161 in 2003, and BS 8010 was formally withdrawn.

The above was complicated by the UK negative vote to the adoption of ISO 13263 as a CEN standard. Reasons for the negative vote were:

- ISO Design Factor for general route is 0.77, equivalent BS Design Factor is 0.72
- ISO advises 8 hour combined strength and leak test, BS advises 24 hours.
- Other numerous less significant differences.

In anticipation of the eventual UK implementation of ISO 13623 as EN 14161, BS actioned a major update of the UK standard for issue as a BS Published Document (PD), to be used to support the implementation of BS EN 14161 in the UK. BS PD 8010 was published in September 2004. Two seminars were held (London, Aberdeen) to launch the publication. A number of issues were raised at the seminars. This note summarises the issues and recommends a UKOPA position.

Issues raised at BS PD 8010 Launch Seminars

The launch seminars covered:

- i) The relationship between ISO 13623, BS EN 14161 and BS PD 8010.
D Willis explained the background and current position, as summarised above.
- ii) HSE and the UK Legislative perspective.
A Thayne explained the requirements for PSR compliance, and stated HSE's position is that UK pipelines should be designed in accordance with BS EN 14161 using BS PD

- 8010 for all detailed technical requirements, gas pipelines should be designed in accordance with IGE TD/1.*
- iii) Onshore pipelines, BS PD 8010 Part 1 - update and technical differences with BS EN 14161.
P Docherty outlined technical updates and differences - onshore – see below.
 - iv) Offshore pipelines, BS PD 8010 Part 2 - update and technical differences with BS EN 14161.
B Inglis outlined technical updates and differences – offshore.
 - v) Relationship between BS PD 8010, IGE TD/1 and BS EN 1594 for gas pipelines.
J Haswell outlined relationship between PD 8010 and IGE/TD/1 Ed 4.
 - vi) Technical Discussion chaired by UKOOA.
J Lawson, UKOOA, initiated discussion focussed on industry requirements for pipeline standards which support major project delivery.

Issues raised in discussion centred on what were seen as the key differences between BS EN 14161 and BS PD 8010, ie

- 1 Design factor (0.77 vs 0.72, and its calculation using mean vs outside diameter).
- 2 Pressure test (8 hours at 1.25 x design pressure vs 24 hours at 1.5 x design pressure or 105% SMYS).
- 3 Depth of cover (0.8m vs 1.1m for agricultural land).
- 4 Population density assessment (BS EN 14161 standard corridor of 400m vs BS PD 8010 pressure/dia relationships or 10, 1 and 0.3 cpm risk contours).
- 5 Operation, maintenance and integrity assurance management (BS EN 14161 is high level only, BS PD 8010 is now extensive to incorporate what was covered by IP6 and to be equivalent to IGE/TD/1).

The discussion demonstrated that the process which controls the issue and implementation of ISO, CEN and BS standards is not well understood, it leaves standards implemented in the UK open to the apparent technical conflicts summarised above and consequently allows queries to be raised regarding requirements for legislative compliance.

Regarding legislative compliance, HSE have clearly stated their recommendation for compliance with PSR is i) BS EN 14161 supported in detail by BS PD 8010, and ii) for gas pipelines IGE/TD/1, or BS PD 8010 supported by IGE/TD/1. However HSE acknowledge that PSR allows alternative standards to be applied, but requires that an equivalent level of risk is demonstrated. In response to comments from designers that the UK regime is not consistent¹ and penalises UK pipeline projects compared to European/International projects, it was proposed that BSI should consider carrying out work to identify a methodology for quantifying and comparing equivalent risk levels inherent in the code hierarchy (ie ISO 13623 : BS EN 14161 : BS PD 8010 : IGE/TD/1 Ed 4).

¹ The reference to consistency related specifically to IGE/TD/1 Ed 4 recommendations for design factors up to 0.8 when supported by a technical justification based on SRA.

Regarding the specific technical differences listed above, these are discussed in detail by Paul Docherty, in a technical note to UKOPA circulated on 22nd September 2004. In this note P Docherty recommends that UKOPA should consider the points and establish a consistent interpretation.

The issues outlined above are summarised in Table 1 below, together with actions to be considered if the impact of “do nothing” is not acceptable or too restrictive.

Table 1 – Issues relating to BS PD 8010 with Recommendations for the UKOPA Position and Actions for Alternative Resolution.

	Issue	Impact of “Do Nothing”	Actions to be Considered
1	Requirements for demonstration of equivalence of risk between codes.	Acceptance of BS PD 8010 recommendations relating to all technical differences.	Request proposals for work programme to demonstrate the acceptability of the risk implicit in BS EN 14161 (see NOTES below).
2	Consistency between UK pipeline codes BS PD 8010 and IGE/TD/1.	Acceptance of BS PD 8010 recommendations for all non-natural gas pipelines.	Transco sponsored work to justify specific use of the 0.8 design factor. In accordance with HSE requirements, most of the work was published for peer group scrutiny. Agree programme of work for collation of published work and incorporation as supplement to BS PD 8010.
3	Design Factor (0.77 vs 0.72)	Acceptance of DF = 0.72 recommended by BS PD 8010 for all non-natural gas pipelines.	Evaluate advantage of moving to 0.77, if advantage is demonstrated identify technical justification required and/or incorporate in Action for Issue 1.
4	Hydrotest requirements (8 hrs vs 24 hrs)	Acceptance of 24 hour test in accordance with BS PD 8010.	Evaluate advantage of reducing test requirements, if advantage is demonstrated identify technical justification required and/or incorporate in Action for Issue 1.
5	Depth of Cover (0.8 vs 1.1m)	Acceptance of BS PD 8010 recommendation.	Evaluate advantage of reducing depth of cover to 0.8m, if advantage is demonstrated identify technical justification required and/or incorporate in Action for Issue 1.
6	Population density assessment (400m corridor vs BPDs/risk contours)	Acceptance of BS PD 8010 recommendation.	<i>This issue will be overtaken by UK LUP requirements, which are being separately addressed via the proposed code supplement for RA methodology.</i>
7	Comprehensive expansion O&M and Integrity Assurance requirements in BS PD 8010	Acceptance of BS PD 8010 recommendation.	Review impact/possible changes to current practice, and/or incorporate in Action for Issue 1.

- NOTES:
- i) PSR allows use of alternative codes in the UK if equivalence of risk between the alternative code and BS PD 8010 is demonstrated. However, for the same design pressure, the actual risk level of a 0.77 df pipeline is higher than a 0.72 df pipeline, and the risk due to failure of a defect surviving a hydrotest of 8 hours at 1.25 design pressure is higher than that of a defect surviving a hydrotest of 24 hours x 1.5 design pressure. It is therefore clear that equivalence of risk cannot be demonstrated for these issues.
 - ii) With the exception of Item 7 in the above table, all issues relate primarily to material and construction costs of new pipelines.

Recommendations

It is recommended that UKOPA should:

- i) Request the BSI PSE/17/2 committee to look into the technical justification which would be required to move from the risk level inherent in BS PD 8010 to those in BS EN 14161, and draft proposals for a work programme to prepare a justification for use of BS EN 14161 which would satisfy PSR requirements.
- ii) Collate work published by Transco to justify use of 0.8 design factors and recommend that BSI use this to publish a supplement to BS PD 8010 to be consistent with IGE/TD/1 Ed 4.
- iii) Compare BS PD 8010 recommendations for O&M and Integrity Assurance with the published UKOPA paper (need UKOPA reference) to confirm equivalence.