

UKOPA Process Safety



Process Safety Benchmarking

Report of the UKOPA Process Safety Working Group

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1 Summary

A methodology for the assessment of pipeline process safety has been developed by the UKOPA Process Safety Working Group (PSWG). A questionnaire based on this methodology has been developed to benchmark the implementation of process safety principles by UKOPA member companies. The questionnaire has been completed by UKOPA members, and the results of the benchmarking are presented in this report. The areas which showed greatest variation in practice were Leadership, Competence and Training and Modifications and Repair Process. To improve understanding of how each member delivers process safety management and promote sharing the UKOPA members are holding a Process Safety Sharing Workshop focusing on the areas with there appears to be the greatest difference in practice.

2 Background

“Process Safety” is a collective name for the measures, systems, procedures or policies which prevent incidents and/or protect people/ environment from effects of Major Accidents.

Major Accidents are those which cause

- Multiple Fatalities
- Significant effect on the Environment
- Major media coverage
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In summary major accidents are high consequence – low frequency events (compared with occupational injuries which are low consequence, high frequency events). Recent major accidents which have drawn attention to the need for process safety are Texas City and Buncefield.

UKOPA is committed to minimising the possibility of a process safety incident on a pipeline in the UK and established a working group to focus on process safety and sharing learning across its members.

Following these incidents, a number of recommendations and initiatives relating to process safety have been made by regulators and major hazard industries, covering Process safety requirements for

- Leadership
- Integrated And Comprehensive Management System
- Knowledge And Expertise
- Culture
- Clearly Defined Expectations And Accountabilities
- Support For Line Management
- Leading And Lagging performance Indicators
- Auditing and monitoring

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The majority of published work relates to single, secure sites rather than distributed assets. On behalf of UKOPA, the Process Safety Working Group has identified the process safety requirements essential for safe pipeline management and operation, and identified the risk controls to be applied.

3 Process Safety Principles for Pipelines

The process safety principles for pipelines were derived from a thorough review of the operations and maintenance sections of the current UK pipelines codes:-

PD 8010 Part 1 2004 Section 13
 IGE/TD/1 Edition 4 2001 Section 11

The key pipeline risk control performance indicators were identified from this review, together with a list of detailed topics to be assessed under each risk control area. The key risk controls and the associated topics are summarized in Table 1 below.

Table 1 Risk Control Performance Indicators and Topics for Assessment

Risk Control Performance Indicator	Topics for Assessment
1. Route Management	<ul style="list-style-type: none"> • Linewalk • Routing survey • Ground movement checks • Change of land use • Mineral extraction & mining operations • Soil erosion, washout • Ground condition (drainage, water logging) • River and all special crossings • Leak detection
2. Asset Records	<ul style="list-style-type: none"> • Design & construction • Maintenance records • Operating manuals • Operating records (pressure cycles, temperature, starts/stops) • Asset information (types, settings) • Availability/accessibility of critical information • Results and data – inspection data • Review and update
3. Operating Procedures	<ul style="list-style-type: none"> • Permit to work • Operating manuals

Risk Control Performance Indicator	Topics for Assessment
	<ul style="list-style-type: none"> • Manning levels • Roles & responsibilities • Pressure management • Control centre(s) • Interfaces with upstream & downstream • Isolation procedures • Alarm management • SCADA & leak detection
4. Competence and Training	<ul style="list-style-type: none"> • Resource assessment • Training plans • Contractor management and competence • Individual competency assessment • Human factors
5. Emergency Response	<ul style="list-style-type: none"> • Availability of emergency plan • Resources • Testing arrangements • Stakeholder liaison • Emergency response facilities • Emergency equipment and spares • Incident response equipment • Communications • Provision of information • PERO • Updating of procedures • Incident response management – pressure reduction etc
6. Leadership	<ul style="list-style-type: none"> • Audit • Action closeout • Incident investigation and review
7. 3 rd Party Interference Management	<ul style="list-style-type: none"> • Aerial & vantage surveillance • Landowner & 3rd party liaison • Markers • 3rd party infringements • One call system • 3rd party works management • Land use planning & management
8. Modification & Repair Process	<ul style="list-style-type: none"> • Defect management process • Repair methods and procedures • New build – exceptions • Changes to design
9. Maintenance, Inspection, Other	<ul style="list-style-type: none"> • Valve station checks and maintenance • Security systems • Signage

Risk Control Performance Indicator	Topics for Assessment
	<ul style="list-style-type: none"> • Protective devices • Instrumentation, telemetry, isolation valve operation • DSEAR • Hazardous area assessments • Pig traps, filters, pressure vessels • Heaters • Electrical equipment - UPS
10. Integrity	<ul style="list-style-type: none"> • Pipe wall defects – dents, gouges, weld anomalies, cracks, laminations • Internal corrosion – <ul style="list-style-type: none"> - product management - pigging • External corrosion – <ul style="list-style-type: none"> - CP system monitoring - coating - AC corrosion - DC corrosion - SCC - MIC - sleeves • AG Pipework - <ul style="list-style-type: none"> - visual examination - insulation

4 Self Assessment Process Safety Questionnaire

A self assessment questionnaire was developed as a series of scored questions to assess and score process safety performance against the detailed topics associated with each risk control. The use of scoring allows operators to evaluate and establish datum levels for particular pipelines or networks, and analyse and compare various approaches on these assets. The purpose is to facilitate self assessment, and to allow focussed discussions between operators on specific areas of mutual interest.

4.1 Scoring Process - The maximum allocated score in each risk control area is not set as a target and must be considered with care, as the total points allocation may not apply to all pipelines; major accident hazard pipelines require additional duties and therefore different practices, some requirements and practices differ for gas and liquid pipelines, and the management of datum levels are affected by asset age. For these reasons, direct comparison of scores may not be relevant, and numerical ranking of scores may not represent ranking of performance. Some specific examples are:-

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Route Management	Specific monitoring of land use and developments applies to MAHPs. Some issues covered are specific to certain environments.
Asset Records	Datum score is dependent upon age of assets.
Operational Procedures	Control room protocols and scopes of work vary. Upstream/downstream interactions are facility dependant. Implementation and use of leak detection varies between gas and liquid pipelines.
Emergency Response	Requirements vary between gas and liquid pipelines. Emergency plan information and testing is required for MAHPs. Access to (and requirement for) additional resources depends on size of the organisation and the specific operation.
Leadership	Area for relevant discussion and sharing of practice.
3 rd party Interference	Consistency expected.
Modifications and repairs	Procedures likely depend upon scale of operation.
Maintenance, Inspection & Other	Some requirements may be dependent upon relevant legislation in addition to PSR (eg PSSR), and type of plant/equipment.
Integrity	Some aspects may vary with scale of operation, type of product, pipeline location etc.

The self assessment questionnaire is web-based, and can be downloaded for completion and use by UKOPA members.

5 UKOPA Process Safety Benchmarking

A benchmarking study has been carried by UKOPA using the self assessment questionnaire described above. The questionnaire was downloaded and completed by UKOPA members, and the results submitted for a confidential benchmarking assessment by the PSWG. The purpose of the study was to identify areas of variation where sharing of procedures and practices between UKOPA members would be of value.

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Twelve UKOPA members submitted responses, three members submitted more than one response. The overall response is therefore a clear demonstration of process safety awareness from UK pipeline operators.

The results of the benchmarking are given in tables:-

Table 2 – all pipeline operators

Table 3 – gas pipeline operators

Table 4 – liquid pipeline operators

In considering the results, attention is drawn to the points raised in Section 3 above.

The results are also shown in figures:-

Figures 1 -3 – all pipeline operators

Figures 4 -6 – gas pipeline operators

Figures 7 -9 – liquid pipeline operators

Figures 1, 4 and 7 show the normalised maximum, minimum and average scores for each risk control area. From the results for all pipeline operators (Figure 1) it is observed that in most cases the average is half way between the max and min, with the exception of Leadership, Competency and Training and Modifications and Repair, where the average is biased towards the maximum score.

Figures 2, 5 and 8 show the normalised maximum and minimum scores for each risk control area. From the results for all pipeline operators (Figure 2) it is observed that Leadership, Competency and Training and Modification and Repair show the greatest difference between maximum and minimum scores.

Figures 3, 6 and 9 show the ranges between the normalised maximum and minimum scores. The results for all pipeline operators (Figure 3) demonstrate the above observations more clearly. A wider range between the maximum and minimum scores indicates there is potential to share learning and experience from the different practices in place.

PSWG considers this should be done through a series of industry workshops.

6 Discussion

The results obtained from the UKOPA pipeline process safety benchmarking study provide comprehensive demonstration of the awareness of process safety issues in the UK pipeline industry.

The numerical results reported in Tables 2, 3 and 4 are interpreted and presented in Figures 1 – 9 above. The observations made are summarised as follows:-

- There is generally an even spread between the maximum and minimum scores

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- Maximum range in scores occurs for:-
 - Leadership
 - Competence and Training
 - Modification and Repair Process

Risk Control areas have been prioritised for further consideration by the PSWG based on the lowest maximum score and the maximum score range in Table 5. The priorities are as follows;

Priority 1 Member workshop to discuss and share differences in procedures and practices

Priority 2 Review to identify specific areas for discussion and monitor trends

Priority 3 Monitor trends

7 Recommendations

Based on the assessment of results, the PSWG recommends that

- i) A UKOPA Workshop is held to discuss, consider and make specific recommendations on the Priority 1 risk control areas:-
 - a. Route Management
 - b. Competence and Training
 - c. Modifications and Repair
- ii) Issues relating to Leadership are given specific consideration by the UKOPA Management Council.
- iii) The benchmarking study is repeated at a two year interval to monitor pipeline process safety issues.