WATER UK

OCCASIONAL GUIDANCE NOTE

PIPE CROSSINGS AND PIPE BRIDGES RISK ASSESSMENT

Issued by the Water UK OHSG **July 2004**
Reviewed **April 2012**

WATER UK OCCASIONAL GUIDANCE NOTE

PIPE CROSSINGS AND PIPE BRIDGES RISK ASSESSMENT

FOREWORD BY BOB BATY

Pipe crossings and pipe bridges can pose serious risks, especially to children. Therefore, whilst it is believed that most such structures belonging to water companies remain well protected, we are striving for complete confidence that throughout the industry everything reasonably practicable is being done to ensure and maintain protection.

Risk assessment on this subject is not straightforward. Every structure poses its own individual problems, and selecting the correct response requires dedication and skill.

Nikki Kemmery of Yorkshire Water is to be commended for leading a team which has produced a practical and simple document. The fresh style of the Guidance Note belies the complexity of the risk assessments and choice of control measures, and in particular the Safety Ratings, Survey Sheets and Risk Matrix will make the task of our busy employees much easier and well understood.

Preparation of this document as a gift to all water companies is an outstanding example of the spirit of co-operation to be found throughout the industry, as we continue to emphasise the paramount importance of safety and health for workers and those affected by our activities.

I am sure everyone will use this Guidance Note to enact and mark a further step forward in the consolidation of our corporate responsibilities.

Bob Baty

on behalf of the Council of Water UK July 2004

INTRODUCTION

Aims of this Guidance Note

The document is intended as guidance for the Water Industry. It has been prepared in conjunction with the Health and Safety Executive (HSE) to provide a risk assessment framework, using existing knowledge and modern risk assessment techniques. The framework has been agreed with the HSE Utilities Section and may be used as a guide by local HSE Inspectors.

Taking a proactive and preventative stance, this document illustrates how pipes, pipe crossings and pipe bridges can be assessed to identify risks to third parties and specifically children. It also proposes options for prevention of access to pipes and pipe bridges and provides a methodology for assessing inspection frequencies.

The pipes referred to in this document carry water or waste water services above ground and are not within the fence of any other asset.

Legal Background

Section 3 of the Health and Safety at Work etc, Act 1974 states that:
It should be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as reasonably practicable, that persons not in his employment who may be affected thereby, are not thereby exposed to risks to their health or safety.

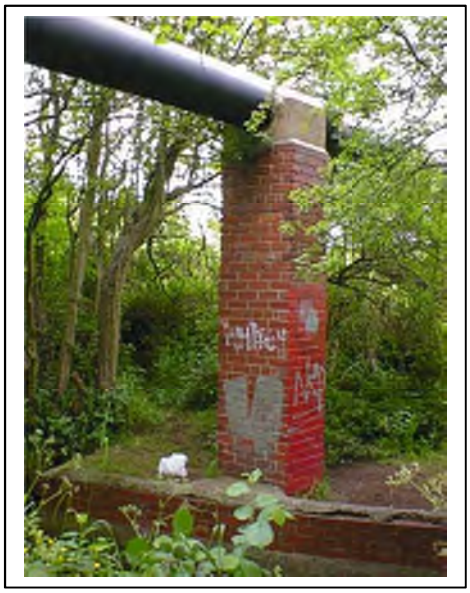
These responsibilities have been made more explicit in the Management of Health and Safety at Work Regulations 1999, which require risk assessments to be undertaken and documented. Additionally, the Occupiers Liability Act 1984 places a duty on an occupier for the safety of persons who are on his land or property without permission.

The employer must demonstrate that they have taken such steps, which are reasonably practicable, by weighing the risks against the measures necessary to eliminate the risks, to prevent exposure to persons not being in their employ to risks to their health and safety.

Definitions

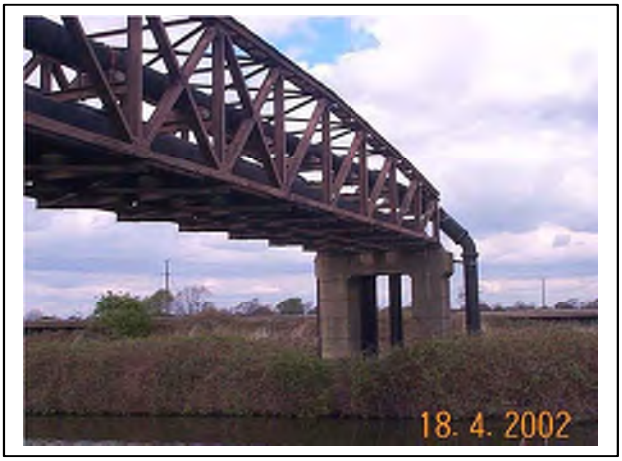
There is a distinction between a pipe bridge and a pipe crossing. Pipe Crossings are generally where a simple supported span of pipe crosses over an area of land or water.

Pipe Crossing

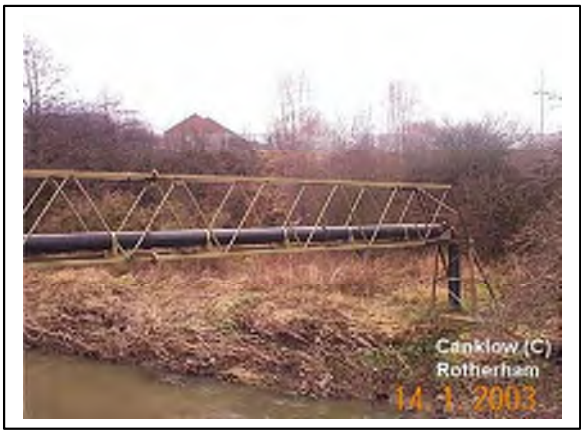


Pipe bridges are more robust structures. Some pipe bridges in addition to pipes carry public footpaths or even vehicular traffic.

Girder Pipe Bridge



Small Girder Pipe Bridge



RISK ASSESSMENT

There are risks associated with pipes and their associated structures. This has been highlighted by a recent case of injury to a child who had used them as play areas.

The following process can be used to identify the risks relating to different types of pipes, pipe crossings and pipe bridges. Appendix. 1 contains a plan for the pipe survey process. Some aspects of the survey may be completed as a paper process using existing data. However, site surveys are likely to be required – a proforma for gathering relevant data is suggested in Appendix.2.

The process for site surveys and any subsequent inspections will need to consider the risks to those undertaking the surveys and incorporate suitable arrangements for ensuring safe access to pipes and pipe bridges.

1. Identify type of pipe and associated structures

Is there a pipe bridge? Is it a pipe crossing by design? What is the length of pipe? What is the diameter of pipe? What height is the structure? What materials have been used? Is the pipe protected by cladding? What material has been used for cladding? What substance is the pipe carrying? Are there other pipes on the bridge e.g. gas mains?

2. Identify location

Is it rural or industrial in location? Is there nearby housing? Are there nearby schools or play areas? Are there nearby public footpaths? Is there presence of vegetation / trees? Are there overhead cables nearby? Is it over water? What type of water e.g. fast flowing / small stream? Over rail / road? Identify the land owner.

3. Assess condition of structures and pipe

Is the pipe covered in algae or other vegetation / materials? What is the potential for pollution from the pipe? Are there signs of physical damage? If yes, then a more detailed survey should be considered. This may require the use of suitable experts e.g. a diver to inspect the river for scouring under the footings or structural engineers to assess the stability of the steel framework. Any evidence of frayed asbestos lagging would require more urgent remediation work than may be otherwise identified using the risk matrix. Specialist advice should be sought in this instance.

4. Assess security and safety

What protection is in place? What condition? Is it within a fenced area? Is there evidence of vandalism? How severe and recent is the vandalism? How easy is the access to the ends of the pipe? How easy is it to circumnavigate the protection? Who may come in contact with the pipe?

A risk matrix can be used – see Appendix.3 for a simple version of a risk matrix. NOTE: However, matrices they should be used with caution – weighting factors may need to be used in order to produce more appropriate scores.

5. Determine overall risk

Is access by third parties reasonably foreseeable? Can reasonably practicable improvements be made to the protection?

Sites may be given an overall category based on the above assessment.

New Installations

Where new installations are planned, if their location is close to attractions for children, such as playgrounds, consideration should be given to under grounding the pipeline as part of the design risk assessment.

PREVENTIVE AND PROTECTIVE MEASURES

The risk assessment will identify the risks and the survey will record the controls in place. Where the protection currently provided is determined to be unacceptable in relation to the risk, there is a requirement to improve this to an acceptable level.

The outcome of the risk assessment process may be:

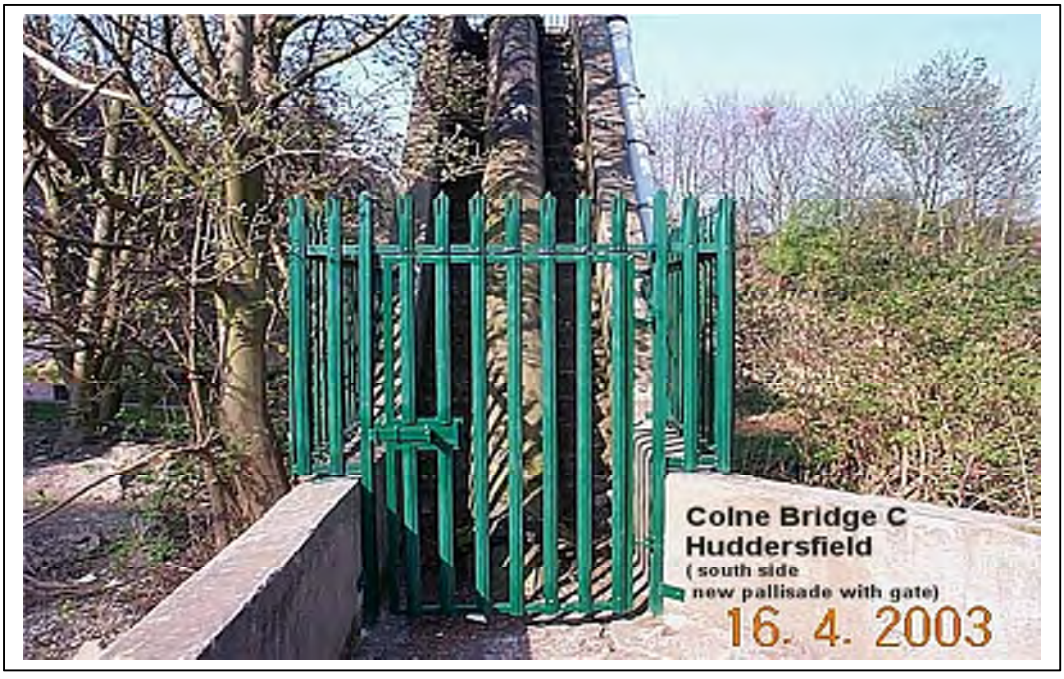
1. No Action Required
2. Warning Signs are Required
3. Additional Physical Precautions are Required

There are a variety of methods that may be used to prevent access to pipes and their associated structures and also protect the pipes from damage.

PIPE BRIDGES

In the main, security fences are used to protect pipe bridges with gates to prevent access. This ensures that at each end and any other access point they are effectively fenced off.

Concrete Bridge with Palisade Fence Protection



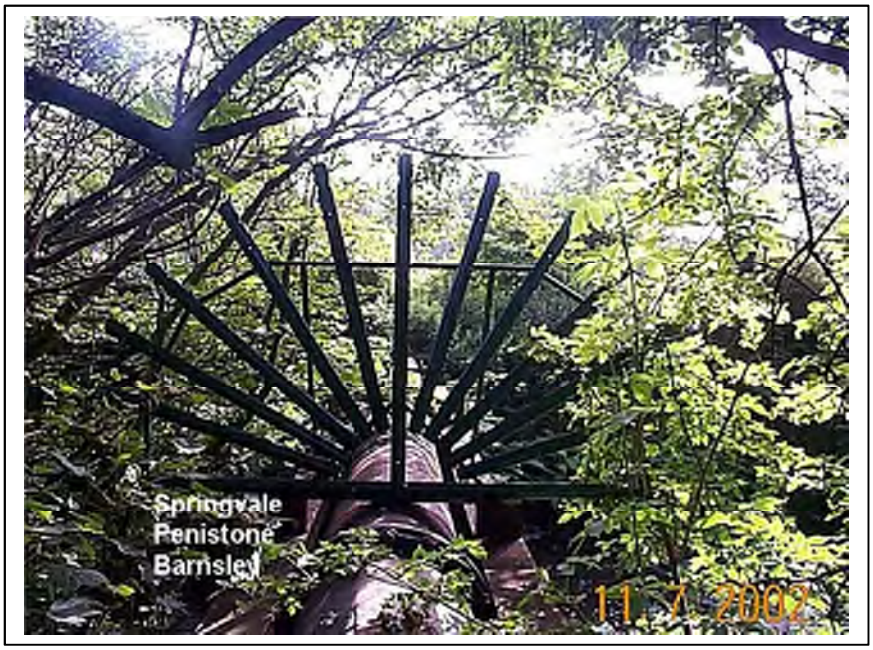
PIPE CROSSINGS

Pipe crossings may have a variety of security features:

- Security fences* with gates at each end.

- Anti-vandal paint.

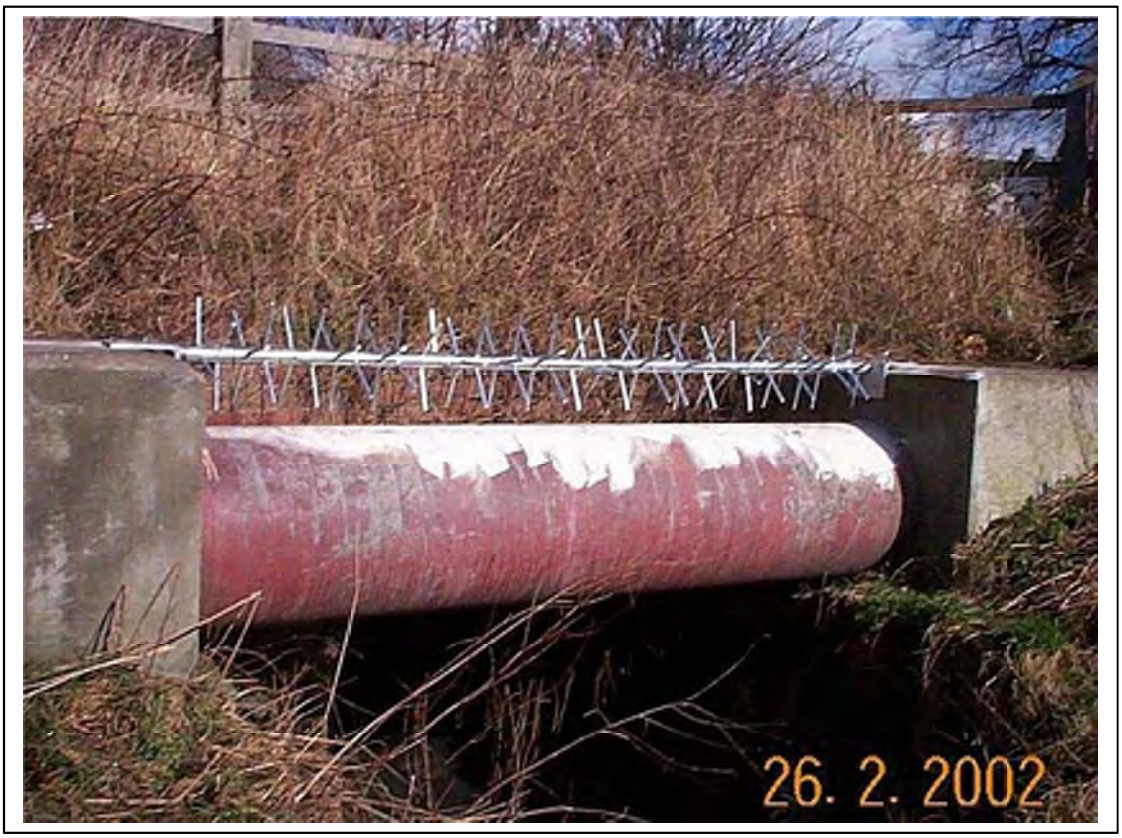
- Security fans*. These are radial bars projecting from the pipe approx. 1-2m long often with spikes or finials.



- Witches hats. These can be effective for small diameters of pipe and comprise of two flat plates attached longitudinally to each side of the pipe and joined at the top to form an upturned 'V' at each end of the crossing.

*Fans or fences used at rail crossings must meet ORR standards.

- Raptor security devices (as used on the top of security fences) arranged longitudinally at each end of the crossing. These consist of a horizontal shaft mounted with a series of rotating spiked elements set on the crown of the pipe at each end of the crossing.



Care must be taken to ensure that the pipe crossing is capable of taking the increased structural loading imposed by any protective device.

INSPECTION OF PIPES AND STRUCTURES

Type of Inspection

Visual inspections should be undertaken to ensure that:

- All fencing is intact
- Protective devices are still in place
- The pipe and its associated structures have not deteriorated / been damaged
- The risks have not changed e.g. new buildings nearby / new footpath

Where more detailed inspections of rail crossings require access to a pipe bridge, supervision by the Network Rail asset protection team is required. Such access may be restricted to the night time when volume of rail traffic is less

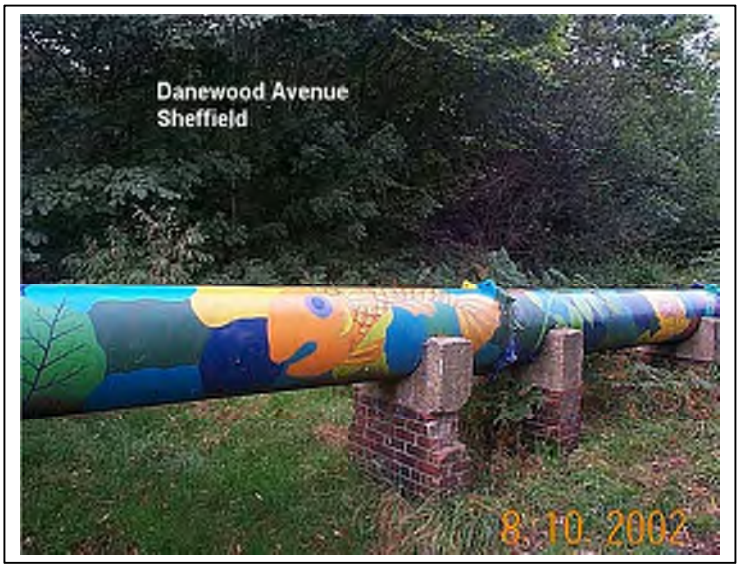
Frequency of Inspection

This can be directly related to the pipe risk assessment outcome. Inspection frequencies may vary, for example, from quarterly to every two years, depending on the findings of the initial assessment.

Pipe bridges and crossings may present different risks at different times of year. Bridges that are visible and "open" to view in the winter can be completely overgrown in the summer. It is important therefore, to set up the frequencies of visits to take this into account; there may be a need to stagger visits to take in the different seasons

In areas adjacent to schools, it may be appropriate to carry out checks in conjunction with school holiday periods.

A record of the outcome of pipe inspections should be made.



Remedial Work

Network Rail will require method statements for any works on pipe bridges that require access trackside. The need for precautionary measures such as speed restrictions means that notice should be given at the earliest opportunity.

In addition any water company employees or contractors going trackside must have written consent from Network Rail, on some occasions, for some tasks, a personal track safety course may be required.

Appendix 1. Survey Process

1. IDENTIFY SITES FOR SURVEY

- Obtain list of sites from existing systems
- Confirm list with Operational teams
- Prioritise list by area and by site.

2. PREPARE FOR SITE SURVEY

- Identify site on mapping system
- Prepare site information
  1. Survey Sheet
  2. Location Map
  3. OS Map of installation

3. COMPLETE SITE SURVEY

- Complete Survey Sheet information
- Make Sketch
- Take Photographs
- File all information

4. COMPLETE RISK RATING MATRIX

- Determine level of risk
- Identify suitable protective measures

5. PREPARE RECOMMENDATIONS

- Discuss with Operational Staff any additional Operational safety requirements
- Discuss proposed protective measures with Operational staff
- Submit to Safety Advisers for Comments where required
- Agree Requirements

6. OBTAIN COSTS/TIMESCALE

7. PRIORITISE REMEDIAL ACTIONS

Appendix 2. Example Site Survey Sheet

Location of pipe bridge …… ……	No

River	Rail	Other	Pipe Diameter	Security/Safety Rating 1 2 3

Structural Condition Survey 0 1 2 3	Pipe Condition Survey 0 1 2 3

Wrapped	Repaired	Material				Scour problems
		P	M	A	C	

P=Plastic, M=Metal, A=Asbestos, C=Concrete

Sketch

Access

……

……

Comments

Safety/Security……

……

Structural……

……

Survey date	Signed

Security/Safety Rating

1	**HIGH**	Heavy vandalism/play area/clear indications of misuse
2	**MEDIUM**	Some signs of vandalism – public access relatively easy – proximity to schools and public footpaths, play areas or highways
3	**LOW**	Low level protection – no indication of misuse or public access

Structural Condition Survey

0	Good condition no work required
1	General maintenance work (see report)
2	Signs of deterioration – some work required
3	Poor state of repair – urgent action required

Pipe Condition Survey

0	No action required
1	General wear and tear
2	Signs of leakage – (see report)
3	Poor condition – further investigation required

Appendix 3. Pipe Risk Matrix

Score 1	2	3	4	5
Location of pipe				**(weighting 2)**
Enclosed within secure compound	In field or private land	In a public open space	Easy access within 10 m	Easy access adjacent to site/ Play area
Height of fall				**(weighting 2)**
less than .5m	.5 to 1.0 m	1.0 -2.0 m	2.0-4.0m	over 4m
Vandalism				**(weighting 1)**
No potential to vandalise	No Signs of vandalism Category 3	Some signs of vandalism Category 2	Evidence of past severe vandalism Category 1	Severe vandalism on regular basis Category 1
Pipe Crossing				**(weighting 2)**
Field or open area	"Dry" ditch	Road or small watercourse	Railway or major road	River or canal
Access to Pipe End 1				**(weighting 1)**
Not accessible	Very Difficult	Difficult	Easy	Very easy
Access to Pipe End 2				**(weighting 1)**
Not accessible	Very Difficult	Difficult	Easy	Very easy
Security Devices				**(weighting 1)**
Brand new. No additional works necessary	Some fitted but more protection needed. In good condition	More needed. That fitted is in poor state of repair	Poor quality / inadequate devices fitted	No devices fitted
Safety Signs				**(weighting 1)**
Sign not necessary	Warning signs present and in good condition	Additional or replacement signs required	Warning signs damaged or vandalised	Warning signs required but not present

Total Score