# Improved Operational Resilience - An improved understanding of and tacking the causes of sewer misuse

Andy Drinkwater

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# Background

## Historically

- Greatest problems - serious sewer dereliction and the lack of hydraulic capacity
- Majority of  sewage flooding of property and pollutions of watercourses were caused by the above problems
- Focus on capital schemes in last three decades to
    - Rehabilitate/replace derelict sewers; and
    - Provide additional hydraulic capacity (storm tanks, new trunk sewers etc.) -

# Background

## Today

- Vast majority of serious sewer dereliction and lack of capacity issues have been dealt with
- Majority of
  - sewage flooding of property and sewage flooding of watercourse incidents are now due to operational problems
  - sewer blockages are caused by inappropriate flushing
  - reactive pumping station visits are also the result of inappropriate flushing

# Inappropriate Flushing -Unflushables

- Dealing with the consequences of **inappropriate flushing - Largest reactive operational cost for sewer system and pumping station operators.**
- Unflushables - Anything but the three Ps:
  - Poo;
  - Pee; and
  - Paper
- Unflushables include:
  - Fats, Oils and Grease (FOG)
  - Wipes and alike
  - Food waste
  - Other items (clothes, concrete, etc)

# Rise in blockage numbers

## Why?

- Increase in inappropriate flushing
- Lower WC flush volumes and greater use of other water efficient devices.
    - Necessary for water conservation.
    - Problem limited if WC flushes are 4.5 or 6 litres
- Poor blockage clearance techniques – Issues now recognised and largely addressed
    - Better clearance techniques
    - Understanding cause of blockage and rectifying it

# Rise in the use of wipes

- Rise in wipe sales has been 10% per annum, apart from last two years
- Rise in the number of blockage incidents has increased approximately in line with the increase in sales of wipes
- Not all blockages can be blamed on wipes – However, majority have wipes as a major component
- Vast majority of pump failures are due to clogging with wipes – Appears to have become a greater problem over the last decade.

# Impact on Network Resilience

**Sewer blockages**

- typically over 80% include a significant presence of wipes or fats, oils and grease (FOG) or both
- typically over 60% have a significant wipes content

**Pumping station failures**

- clogging pf pumps, usually by wipes
- FOG – also clogs pumps and confuses wet well sensors

# Impact on Network Resilience

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# The Solutions

Focus on:

- Fats, Oils and Greases (FOG)
- Flushables (Wipes)
- Understanding the cause of Blockages

Work including:

- Customer engagement – includes residential customers and Food Service establishments
- Engagement and working with suppliers and manufactures
- Flushability testing specification
- Better understanding of blockage cause

# Fats, Oils and Grease (FOG)

- Engage with food service establishments (FSEs)
  - Most water & sewerage companies now have dedicated teams
- Better grease separators (standards etc.):
  - Only UK standard is BS EN 1825 for large static devices – much misinformation on internet
  - Possible use of North American standards ?
- Improved dosing technology:
  - Have been some successes but also some failures
  - Still a need to better understand why
- Can FOG removal techniques be improved – Fatberg problems

# Flushables

- Customer engagement – can help but needs regular reinforcement
- Better understanding of content of blockages
- Engage with retailers and manufacturers
- Use of press to get the message across
- Development of flushable wipes
- Flushability testing specification – ‘Fine to Flush’

# ‘Fine to Flush’


**WATER INDUSTRY SPECIFICATION**

Fine to Flush:
WIS 4-02-06
January 2013: Issue 1
(Page 1 of 30)

UK Water Industry

## Fine to Flush:
SPECIFICATION FOR A TESTING METHODOLGY TO DETERMINE WHETHER A PRODUCT IS SUITABLE FOR DISPOSAL THROUGH A DRAIN OR SEWER SYSTEM

### FOREWORD

Sewers serving premises are designed to receive the "contents of lavatories", "water which has been used for cooking or washing" and surface water.

The most common problem with sewer systems is blockage of pipelines or pumps. This can lead to loss of service, sewer flooding or pollution of the environment. Resolving these blockages is also a major cost to sewer system operators.

One of the major causes of blockages is the disposal/flushing to sewer of inappropriate and unsuitable items.

There are many products that are approximately the size of toilet tissue and appear to flush from the WC bowl. However they have the potential to cause significant problems once in the wastewater system.

Section 111 of the Water Industry Act, 1991 prohibits the disposal of harmful substances into public sewers or drains communicating to a public sewer. These include anything that would damage the fabric of the sewer system, interfere with the free flow of the sewer, or prejudicially affect the treatment works. Also any substance that is dangerous, would cause a nuisance or would be injurious or likely to cause injury to health.

Reference to a European Standard, British Standard or Water Industry Specification applies equally to any equivalent specification.

It has been assumed in the drafting of this specification that the execution of its provisions is entrusted to appropriately qualified and experienced people, for whose guidance it has been prepared.

Information contained in this specification is given in good faith. Neither Water UK nor the members of its Standards Board can accept any responsibility for actions taken as a result.

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[1] Water Industry Act 1991: Section 117.

This document has been prepared by the Water UK Standards Board. Technical queries should be addressed to the Standards Board (c/o wis@water.org.uk). The latest version of this document can be downloaded from http://www.water.org.uk/

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# ‘Fine to Flush’

- Testing specification to UK water industry requirements – WIS 4-02 06.
- Compliant with ISO technical report TR 24524.
- Launched 11th January 2019.
- Includes seven tests:
  - Disintegration (two tests).
  - WC and drainline flush (two tests).
  - Snagging.
  - Settlement.
  - Plastic content.
- Significant interest from a number of retailers & manufacturers.
- First compliant product – Expected February 2019.

# Solutions – Blockages

- Improved blockage clearance techniques
  - Much research in recent years, now being implemented
- Improved understanding of causes of blockage formation
- Many blockages still remain as ‘unexplained’
- Ongoing research showing that
  - combinations of small defects / features can start a blockage forming – Many of these features not currently recorded on CCTV coding
  - partial blockages can break free and roll down the pipe, possibly growing in size!

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