The so called flushables menace – Wipes and fatbergs

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During the last twenty years the main cause of sewage flooding of property and sewage pollution of watercourses has changed, from a lack of capacity / network issues to problems caused by inappropriate flushing / disposal to the sewer system. The water industry has made significant progress in improving combined sewer systems so that they are far less likely to overflow during heavy rainfall. This work has included providing additional capacity, both by constructing storm storage tanks and new interceptor / relief sewers. It has been successful in significantly reducing the number of storm related sewage spills to watercourses and sewage flooding of property.

Unfortunately, the success has been somewhat overshadowed by the growing nuisance of inappropriate flushing. This includes the disposal of fats. oils and grease (FOG) in the kitchen and the flushing (via the WC) of wipes that do not disintegrate or disintegrate to a sufficient degree. Wipes and fatbergs are now a major issue for the UK Water Industry.

Today, the vast majority of sewer blockages include wipes (or other non flushables) as a major component of the blockage material. Water companies often quote that between 50% and 80% of blockages are primarily caused by wipes.

A sewer blockage removed intact. This shows that wipes were main component

A further issue is wipes and or lumps of FOG fouling pumps or the pump on/off level sensors. The problem is so great that typically over 80% of emergency calls outs to sewage pumping stations are because of these issues.

Wipes fouling a pump

FOG adhering to the pipe walls is another major problem, particularly in town centres where there are concentrations of catering establishments / fast food outlets. On some occasions the problem becomes so great that a ‘fatberg’ develops. Besides FOG this can include large numbers of wipes.

The cost to the water industry, which inevitably has to be passed on to the consumer, is significant. For example, sewer blockage clearance is costing the UK water industry over £ 100 million per annum and this does not include the cost of issues in the private pipe network immediately downstream of properties. The cost of attending pumping station call outs is also significant.

Also, a proportion of sewer blockages and pumping station failures will lead to backing up in the sewer system that is sufficiently serious enough to result in either a spill to a watercourses or inside customers properties. Today, the situation is so serious that the majority of sewage flooding of domestic property and sewage pollutions of watercourses are caused by these issues. These problems are entirely avoidable and not the result of heavy rain. They could be avoided if people obeyed the three P’s flushing rule – Only flush pee, poo and paper.

Thus, the problem has changed from one of requiring capital investment in order to enlarge sewer systems, build retention tanks etc, to one of focussing on what is flushed. A particular issue is that the owner and operator of the sewer system, unlike all other enclosed pipe systems, has very little control over what enters the system. This is not the case with potable water systems, oil or gas pipelines or industrial process pipelines. The task has become one of engaging with customers to better avoid unsuitable items being flushed, working with manufacturers/retailers of products that may be flushed and finding better ways of detecting and removing the offending items.

Whilst large capital schemes are not required to address the problem, the issues are none the less complex and require input from various sectors of the water industry. No one solution fits all and the water industry has been developing a number of initiatives aimed at addressing the problem. These include customer awareness campaigns, introducing improved operational techniques to deal with problems and updating a flushability testing standard which all items intended to be flushed should have to achieve.

All water and sewerage companies (WaSCs) are engaging with domestic customers to inform them of the consequences of inappropriate disposal, both in the kitchen and bathroom. Experience has shown that this can have some success but the campaigns can be labour intensive and need to be repeated every few years.

Engaging with food service establishments (FSEs) is another priority for WaSCs. This is particularly so in town centres where concentrations of food outlets can result in serious FOG problems. In some circumstances the situation can be serious enough to result in the formation of fatbergs. The approach can be successful but with so many FSEs it is a never-ending task.

Significant deposits of FOG fouling large brick sewer

Sewer operations teams have helped to contain the problem by introducing improved operational practices. A noteworthy success has been the introduction of improved sewer jetting and blockage clearance techniques. These improvements, which have partially been driven by research undertaken by WRc, have resulted in reductions in the number of repeat visits. In recent years this has been reflected by a number of WaSCs starting to report reductions in the number of blockages. However, the number of blockages is still far too high and, despite post blockage investigations being carried out, the reason(s) for many of these blockages remain unexplained.

In 2017 WRc commenced a new programme of work to better understand the cause of blockages. This has involved simulating blockages in small domestic drains by using an above ground test rig. The work, which is still ongoing with a number of WaSCs, is showing that combinations of relatively minor pipe defects can result in blockages developing. The work is also showing that partially formed blockages can break free, roll down the pipe and eventually come to rest some distance from where they started to form. It may therefore be the case that the eventual location of a blockage is some distance downstream from where it started to form. It is WRc's intention to issue further advice to those WaSCs participating in the project, to help to better identify the type and location of the minor defects that initiated the blockage formation.

A major area of work since 2005 has been to better understand 'flushability', in particular the characteristics that a flushed product needs to attain to make it suitable for WC flushing. The first document was published by WRc as a Portfolio research project in 2007. This was updated as a UKWIR project in 2012 and published as the SNAP Protocol. In 2017 the opportunity was taken to update this document with Water UK. An example of the need to update was to include a test to

identify the presence of petro chemical derived plastic strands. If present these strands would pass through a sewage treatment process and be discharged to the receiving water and onwards to the sea. A draft of this third generation UK water industry document was issued for comment in 2018. The finalised document was subsequently released by Water UK in January 2019. This is commonly referred to as 'Fine to Flush', and has a Water Industry Specification, reference WIS 4-02-06.

'Fine to Flush' specifies seven tests, as follows: i) WC bowl clearance; ii) Drainline clearance; iii) Disintegration in the drainline; iv) Snagging in the drainline; v) Disintegration in the sewer; vi) Settlement; and vii) Determination of synthetic and non-synthetic organic components (the plastic test).

In addition, for a product to qualify for 'Fine to Flush' testing, when used as intended it is likely to become contaminated with faeces or other body waste. This requirement is to ensure that only products that are used in association with toileting could be marked with the 'fine to Flush' kite mark. This rules out the possibility of floor cleaning wipes, cosmetic removal wipes etc. being labelled flushable, the correct disposal route for such items should be via the solid waste bin.

The 'Fine to Flush' logo

To date (April 2019) one wet wipe has passed the tests specified in 'Fine to Flush'. There are a number of other products undergoing testing and requests for more information about 'Fine to Flush' have been received from manufacturers in mainland Europe and beyond.

It is clear that there are many products on the market today that are a significant improvement on the products that were around just five years ago. Whilst many of these products don't currently achieve the required level of breakdown to pass 'Fine to Flush', they present far less problem to the sewer system than previous generation products. This must be regarded as a success and manufacturers should be encouraged to go the extra mile to develop / manufacture compliant products.

Some people have asked if there is a price to pay for the new technology wipes. It is true that initially the new wipes will cost slightly more. However, as time passes and the technology becomes mainstream the price difference should become minimal. There are plenty of other examples where a new technology has become affordable, for example many years ago colour televisions were regarded as a luxury.

Fatbergs have been very much in evidence in recent years. The problem is that when they are found it is very difficult to remove them, all too often labour intensive Victorian techniques have to be used. The time has come to see if robotics and new technology can be used to help in this task

Wipes retrieved from the Sidmouth Fatberg

Customer understanding of the problem is important. A few years ago the problems caused by wipes and fatbergs were not talked about and relatively few people were aware of the perils of inappropriate flushing. Fortunately, there has been a significant change over the last two years. There have been numerous press articles, (newspapers, radio and TV), on the subject and there must be very few people who are not aware that there is a potential issue with inappropriate flushing. The environmental message is particularly powerful, '*sewer blockages caused by inappropriate flushing are the cause of most sewage pollutions of watercourses and sewage flooding of property'*.

So what does the future hold for the flushability issue? It is clear that the problem is not going away anytime soon and a lot of effort still needs to be put in by the various stakeholders in order to further reduce the problem. The water industry has developed a number of initiatives but it alone cannot solve the problem. Customers need to be aware of what can and cannot be flushed, and manufacturers and retailers need to step up to the mark to ensure that unsuitable products are marked do not flush or, better still, are replaced by far more suitable new technology products. The signs are encouraging but more work still needs to be done.

Solving the wet wipe problem will help to reduce the fatberg issue but that alone will not solve it. The main constituents of a fatberg are the fats, oils and greases often discharged from commercial food premises, hotels etc. The problem is usually caused by poor kitchen practice and a lack of suitable grease separators or separator maintenance. WaSCs rightly target the most serious FOG dischargers and this policy can be successful. However, there are so many food establishments that currently WaSCs can only play catch up. A change in legislation forcing FSEs to install and maintain an adequate method of grease management would help. Currently there is a requirement at the planning application stage but there is nothing to say that it must be operated and adequately maintained. Also, there are no standards or specifications covering the small grease separators often used internally within kitchens. BS EN 1825 covers large (often external underground) separators but these are unsuitable for most town centre locations. There are standards in North America and some of these may be helpful in a UK situation.

So where do we go from here? The answer is to keep working away and don't be afraid of trying new ideas, particularly where there is evidence of success elsewhere.

For more information on 'Fine to Flush' visit either the Water UK (water.org.uk) or WRc (WRcplc.co.uk) websites and search for 'Fine to Flush'. .For other information regarding flushables, fatbergs or FOG please contact the author, andy.drinkwater@wrcplc.co.uk