2019

Utility Strike Damages Report

Prepared by the USAG Data & Reporting Working Group

For the benefit of UK PLC,

including utility companies, contractors, developers, consultants, regulators, Government and the general public.

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1.0 Executive Summary

Utility strikes represent an ever-present threat to human life. Hundreds of people have died across the World as a result of strikes on underground and overhead cables and pipelines. In addition, there are billions *(Reducing Damage to Underground Utility Infrastructure during Excavation Costs, benefits, technical advances, case studies, and recommendations Prepared for the Geospatial Information & Technology Association By Geoff Zeiss and Sakura Shinoaki)* of pounds of physical and environment damages incurred every year of which hundreds of millions of pounds are within the UK every year.

As there are over 12,000 works taking place every day across the UK, it is critical that we learn from near misses and lower consequence strikes to minimise the risk that workers are facing on a daily basis. The utility networks that run over our heads and below our feet extend to over 1.5 million km and are fundamental to daily life. Typical planned maintenance works will themselves cause some level of manageable impact to these networks but any unplanned interventions will have a far greater and longer impact.

This report summarises the key findings of approximately 2500 utility strikes across the UK during 2019 based on responses from 44 USAG Members. It highlights what caused the most damages and provides scope and recommendations to:

- ✓ Avoid future damages
- ✓ Improve the ability to analyse the strike data in future years.

It builds on the previous reports since 2013 and provides commentary against previous years' data. Many issues were replicated across the periods which strengthens the conclusions made.

The main conclusions for the causes were:

- Better preparation in advance of breaking ground / construction works commencing. This should be through availability of more accurate plans and the use of more robust location and survey practices.
- Behavioural issues on site during the execution of the works is a key issue; it is recommended that the root causes are established and investigated further.

What you can do to help the industry and reduce asset strikes

- ✓ Distribute this report within your organisation and to your wider industry contacts
- ✓ Ensure that your company is signed up to the USAG Safe Dig charter and supports the initiative by submitting data for the 2020 report in the appropriate format
- ✓ Contact us via data@utilitystrikeavoidancegroup.org or via social media with any feedback
- ✓ Support and spread the work of USAG through promotion via your own channels and social media.

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2.0 Introduction and general comments

Why this report is important

As utility strikes are such an important issue, there are many groups and organisations actively engaged and working hard in the pursuit of the elimination of them. Significant improvements have recently been made because of these efforts; the role of USAG and this report is to ensure that as many people are made aware of strikes and how to minimise the risk of them.

The industry needs a collaborative effort to ensure effective and sustainable change. Whilst there is no "silver bullet", USAG is aiming to achieve the following:

- ✓ Analysing the results received (when, where, how, what)
- ✓ Understanding the potential causes (why)
- ✓ Creating a baseline to understand current performance and to measure future continued improvement
- ✓ Raising the profile of the issues faced by the industry by expanding USAG's engagement with key stakeholders and influencers.

By doing so, USAG and all contributors can collectively prevent injury, damage, disruption and raise the performance standards across our industry. Secondary benefits generated include:

- ✓ Improvement in overall efficiencies
- ✓ Reduction in costs (both direct and indirect)
- ✓ Greater certainty of program delivery (including major projects such as fibre rollout and Electric Vehicle (EV) charging)
- ✓ Better customer experience &
- ✓ Improved profile of the industry.

Learning from some of the best international practices

Similar reports are produced annually in other parts of the world (in particular the USA and Canada) which are now well established and have been instrumental in understanding the problems and reducing utility strikes.

It is important to learn from our international colleagues, showing that the UK is equally committed to improving our practices, to continue to reduce damages and ensure everyone goes home safe every day. It is recognised that the analysis of such information on a national scale in the UK is in its formative years but it is believed that by us all working together, we can help ensure that utility strikes can become a thing of the past. USAG is improving links with our international colleagues but would appreciate any contacts that our Members can suggest.

How the report is structured

This report builds on the findings of the previous years' reports. The request for data was circulated across industry stakeholders and we collected information from a record 44 USAG Members which provided details relating to over 2500 utility strikes. These strikes have been analysed in the following areas:

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- When the strike occurred
  - Month
  - Day
  - Time
- Where the strike occurred
  - Location type
- How the asset was damaged
  - Equipment used
- What the damage was
  - Asset type
- Why the asset was damaged
  - Nature of works
  - Cause of damage- planning
  - Cause of damage- execution

Each section shows a figure (graph), a brief commentary on the data, comparison with the previous reports and some industry recommendations for improvement.

Improving the volume of strike data submitted

Current situation

This year, the volume of data received is significantly increased from recent years reflecting the positive reach of USAG across the industry:

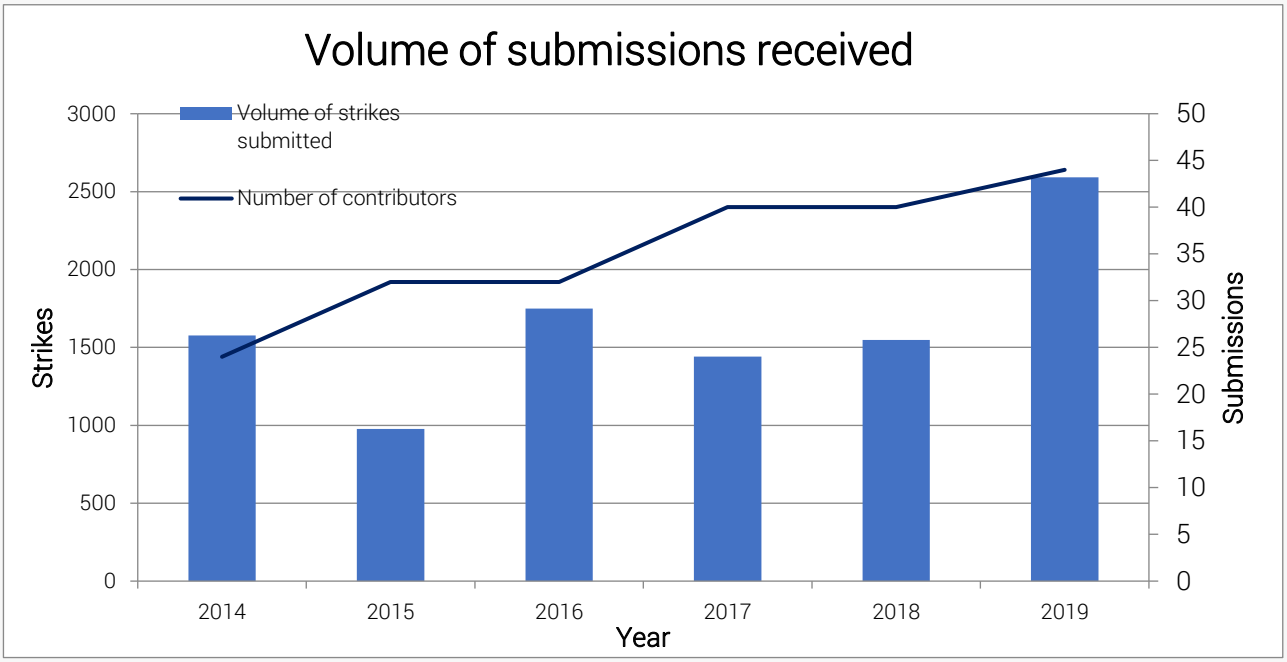

Figure A: Number of utility strikes and contributors by year

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Improvements to be made

Regrettably, several organisations took the effort of submitting data but did so in the incorrect format which meant that much of their data could not be used- **approximately 20% of those responses were affected in this way**.

Proposed solution

- ✓ Work with those companies who kindly sent in data albeit in the wrong format
- ✓ Keep it simple to encourage completion
- ✓ Minimise any changes between years
- ✓ Get to a point where strikes can be submitted during the year they occur (via an online platform)
- ✓ Identify and target relevant organisations that should be USAG members
- ✓ Ensure that every organisation understands its duties as being a charter signatory.

Data Collection

The data used within this report was gathered through a survey period following requests to USAG Members, associated CECA Members as well as other key stakeholders.

The request included the following:

1. **Letter** (Appendix 1) introducing the report and our intentions.
2. **Strike Data Template** (Appendix 2) in a standard (Excel) format.
3. **Data Categories** (Appendix 3) to help collate information for the spreadsheet.

Acknowledgements

Thank you to all of those that responded with utility strike information, sharing your data for the wider good of the industry. Your support is very much appreciated.

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3.0 USAG 2019 Strike Analysis

When the strike occurred- Month

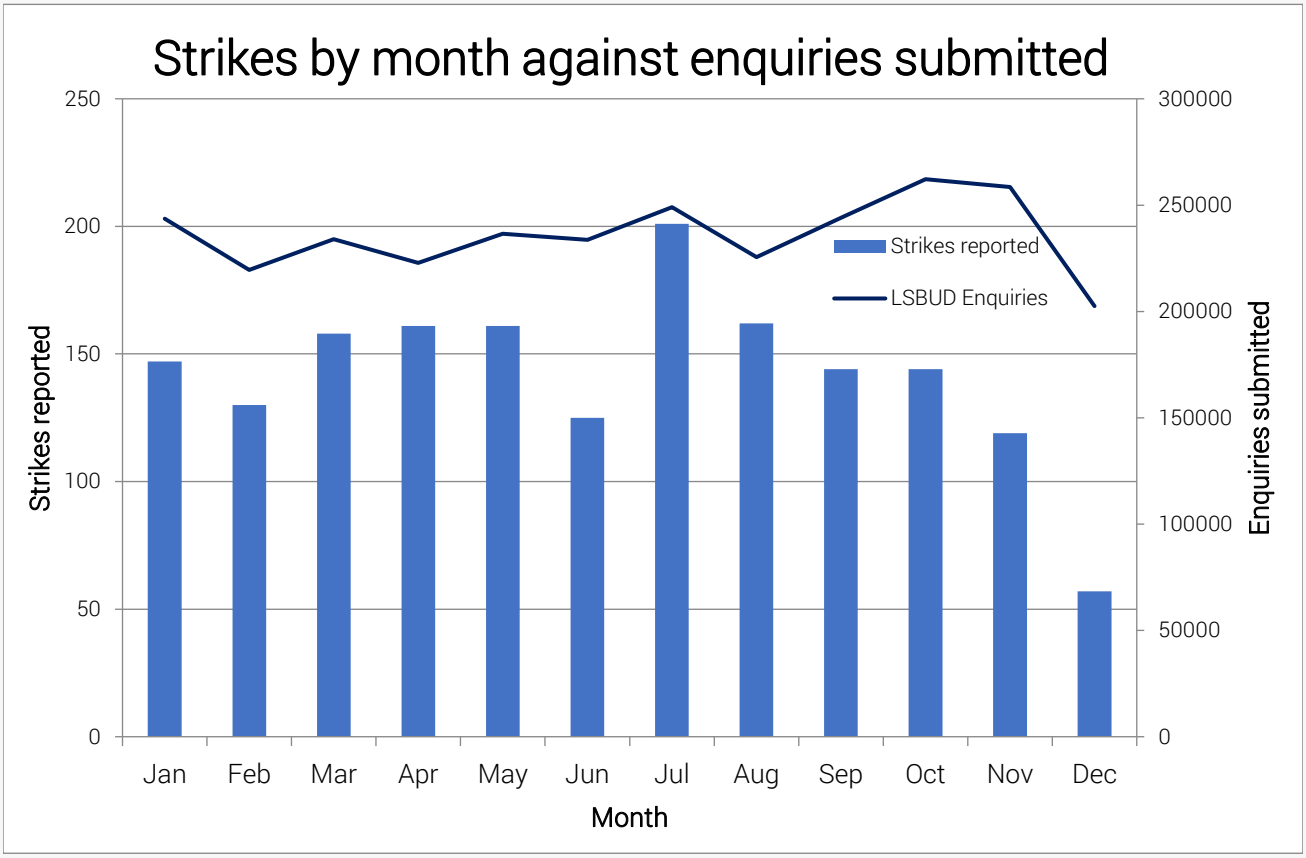

Figure 1: Number of utility strikes by month in 2019 compared to LSBUD enquiries

As for previous years, we have used the number of enquiries received through the LSBUD (Linesearch BeforeUdig) service as the only available source of data available to indicate the volume of works being undertaken. The results continue to reflect correlation although there remains the need to get more sources of data for the volume of works undertaken.

The following conclusions are drawn:

- The peak of strikes in July has been consistent since 2013. The overall period **May-August** has always had the highest volume of strikes but this year there was an odd result for June. This may have been due to an unusually wet month in June 2019.
    - The general increase in the summer months is typical due to longer working days with mixed teams and holiday cover.
- The winter months of **November-February** again have c. 30% fewer strikes. This is possibly due to fewer works taking place as result of shorter daylight hours, poorer weather etc. but the difference against LSBUD enquiries made in these months is significant- it is not directly proportional against the volume of enquiries being made. Currently there is not sufficient data to allow us to make firm conclusions, so it is an area that we are looking to focus on in future years.

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Guideline industry recommendations

1. Continue the positive trend of more contributors submitting their strike data in the correct format to allow further analysis. This will allow much more confidence in the analysis.
   Be aware of higher risk months and ensure that guidance is in place to mitigate any of the factors above.
   Contractors must be aware that once weather conditions allow increased work activity, they do not rush into work and increase the risk of strikes.
   Each contributor to consider their own results and provide commentary.
   Provide other relevant industry sources to compare to the LSBUD data as this is critical for the effectiveness of the analysis.

When the strike occurred- Day

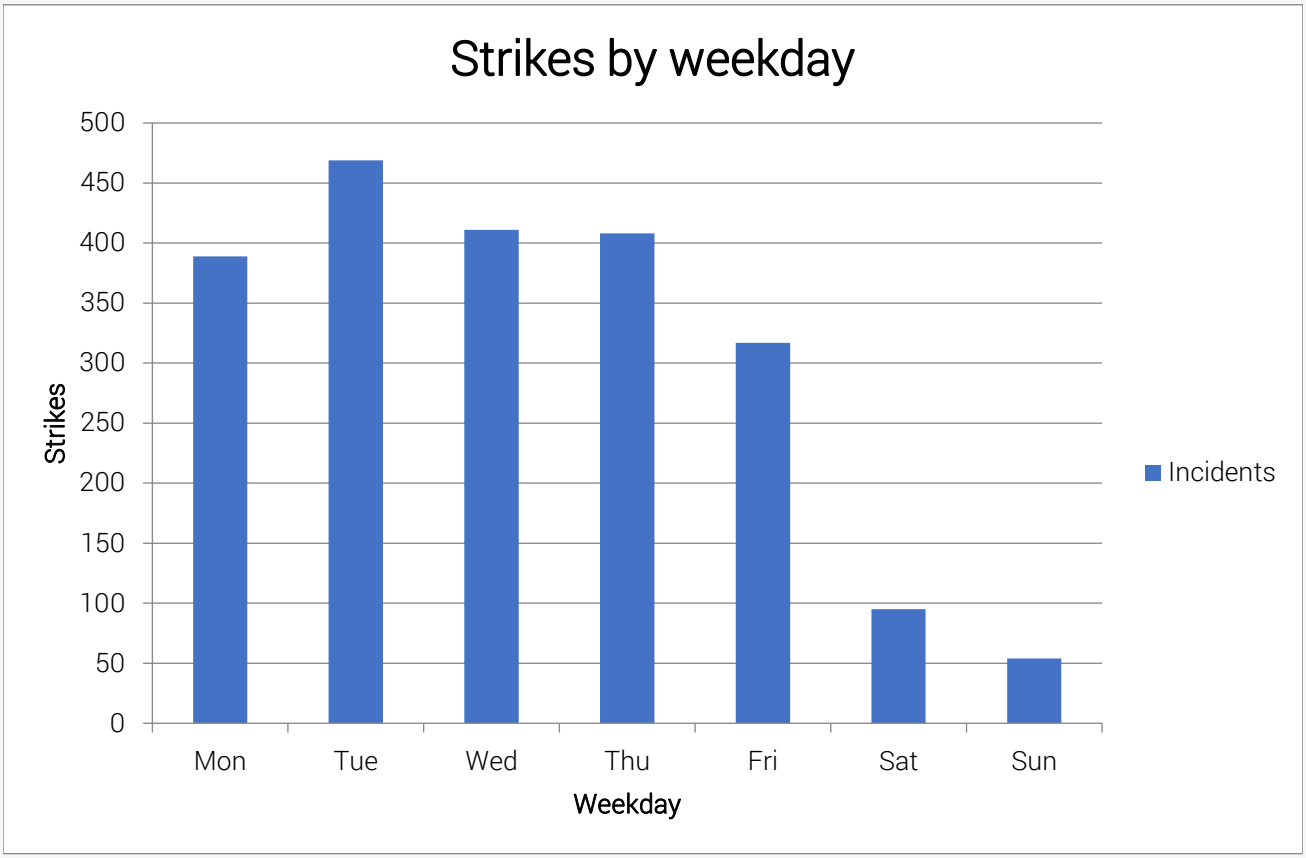

Figure 2: Number of strikes by weekday in 2019

As in previous years, there was a reduction of strikes over the weekend when the work was significantly reduced. There is a peak on Tuesday with a gradual tail off towards the latter part of the week (Wednesday relative volumes were suppressed compared to previous years). This is likely to be because of setting up more works at the beginning of the week and backfilling/closing down sites towards the end of the week.

There has been a welcomed improvement in the data quality received, with the vast majority of contributors reporting the day of the strike.

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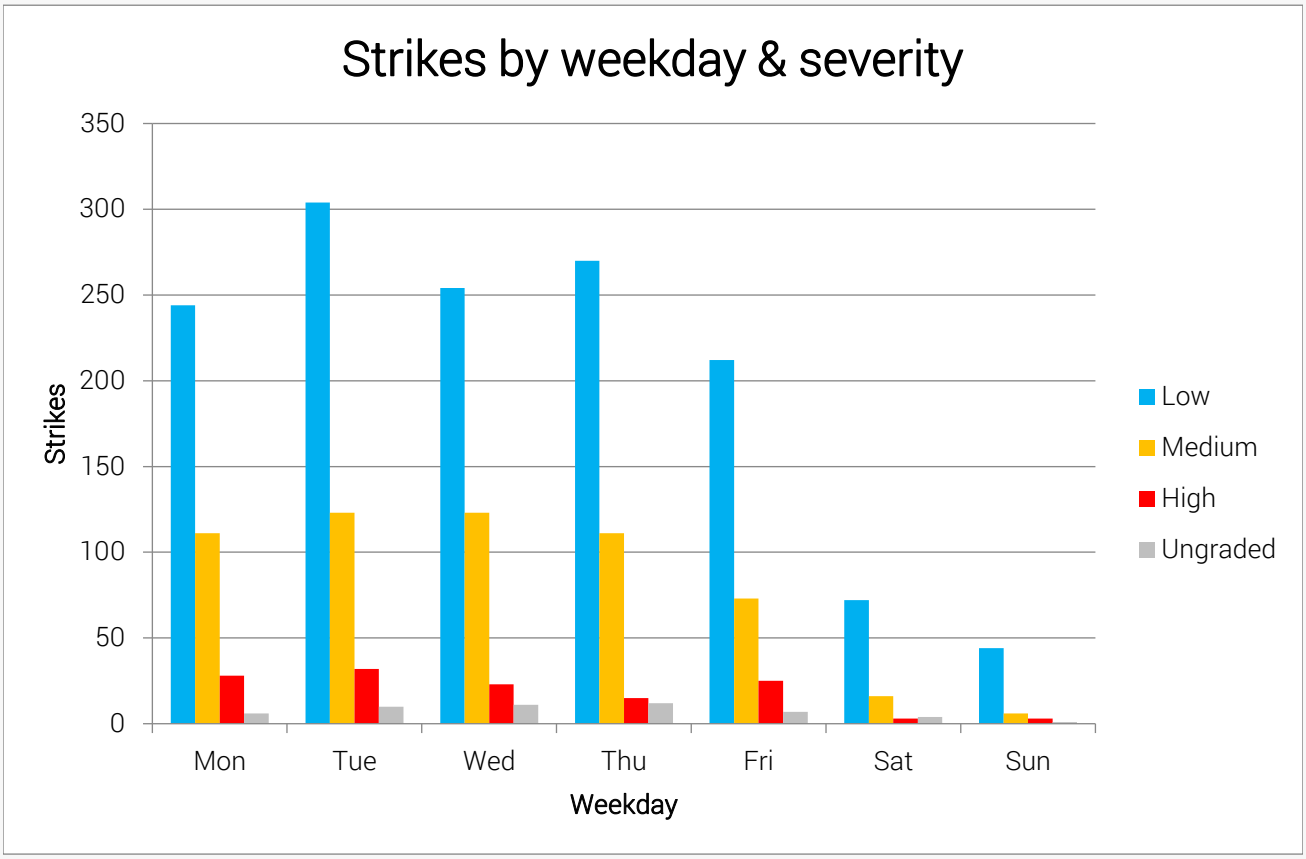

Figure 3: Number of strikes by weekday and severity in 2019

We then looked at the severity of strikes each day which suggests, again as expected, that most strikes reported were low risk, with a similar proportion of medium and high risk strikes throughout the week. There was a noticeable increase in high level risk strikes reported- this may be due to interpretation of the risk levels.

Guideline industry recommendations

1. Be aware of higher risk days and ensure that guidance is in place to mitigate any of the factors above.
   Re-emphasise any safe digging messages to on-site teams throughout the week.
   Each contributor to evaluate their own results and provide commentary.

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When the strike occurred- Time of day

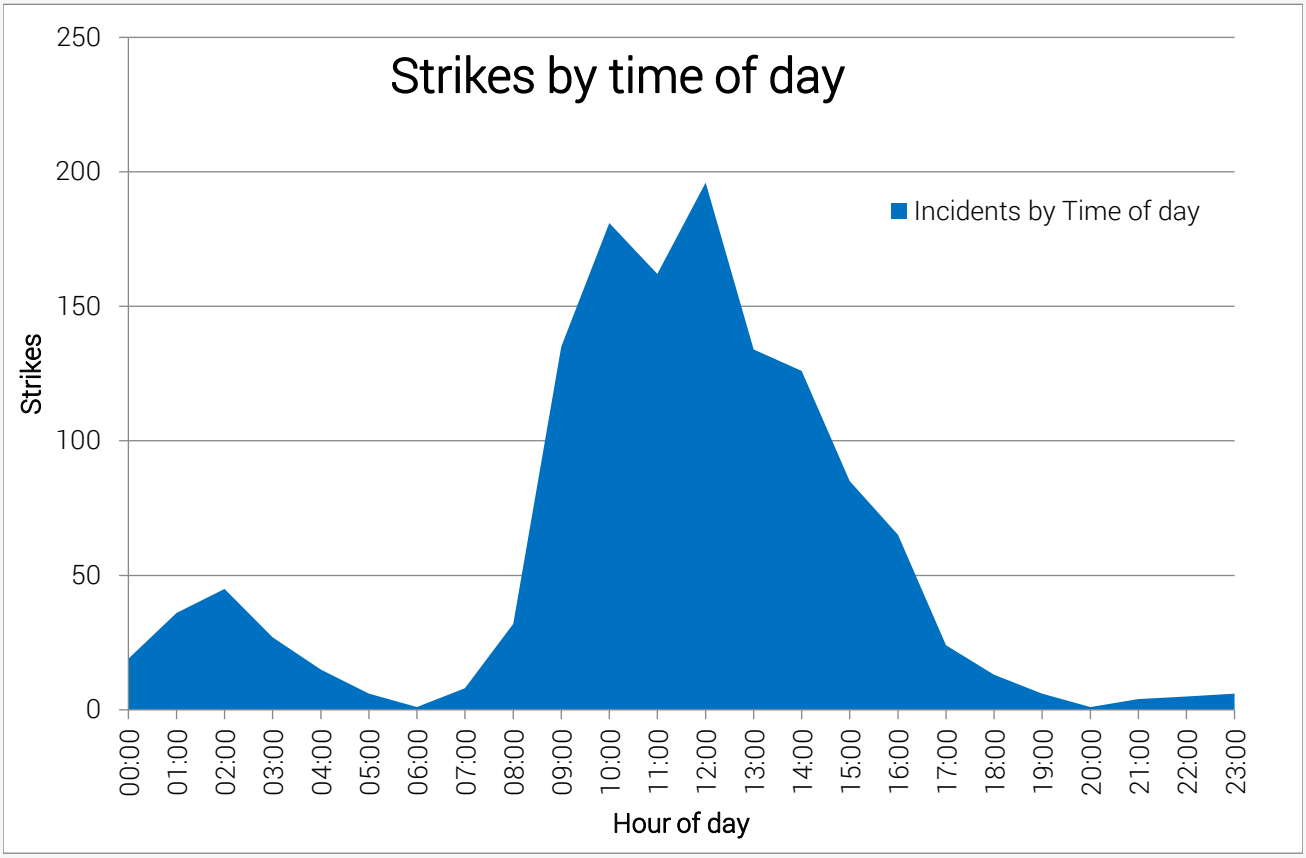

Figure 4: Number of strikes by time of day in 2019

Most strikes reported took place during the typical working day. There are spikes in mid and late morning- at approx. 1000 and 1200 which is very similar to previous years' data.

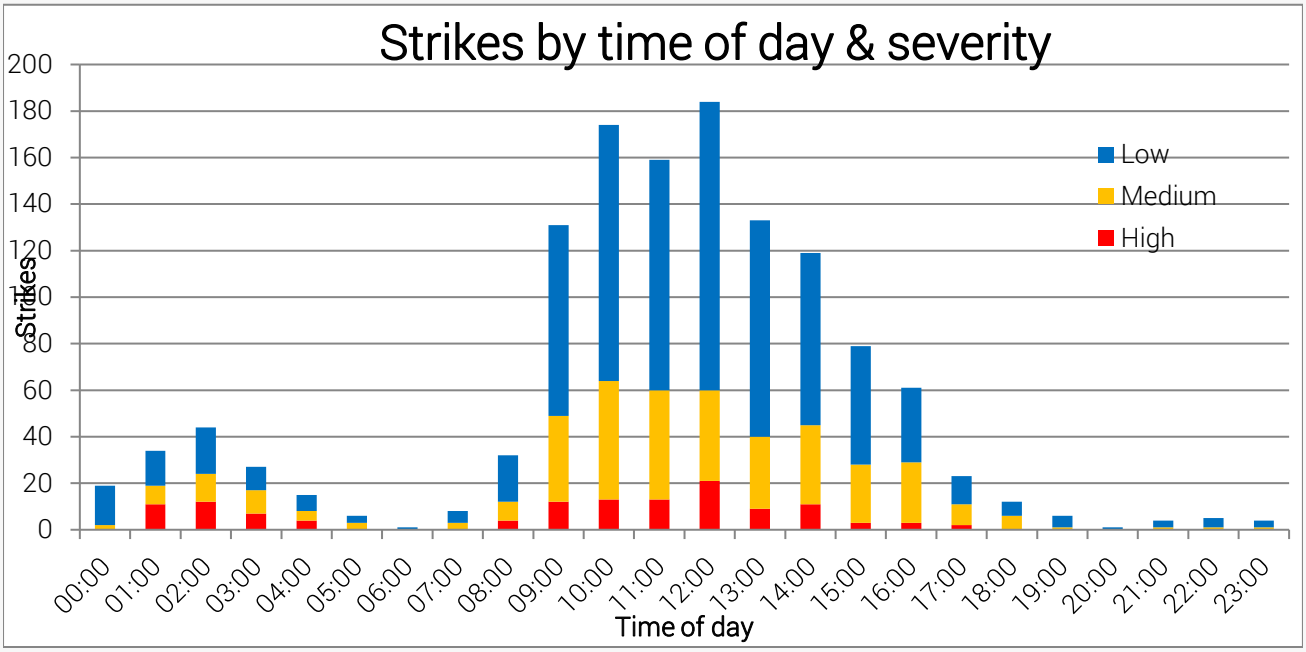

Figure 5: Number of strikes by time of day and severity in 2019

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We then looked at the severity of the strikes across the time periods, which clearly showed that whilst most high risk strikes took place at 1200, there was a much higher proportion in the early hours. The data suggests that there was a danger time period between 0100 - 0400 where if you were involved in a strike, it was more likely to be high risk. This may be as a result of a higher proportion of unplanned work taking place during this time period where access to safety resources may not be as readily available and ability to undertake standard procedures may be compromised.

This will be an area of further study and focus in coming years, particularly referencing the working conditions, supervision and timescales for completing the work.

Guideline industry recommendations

1. Be aware of higher risk time periods and ensure that guidance is in place to mitigate any of the factors above.
    - Consider out of hours working and how that can be managed effectively to reduce risk. N.B. Future studies will assess the correlation between strikes taking place at these times and emergency jobs.
2. Each contributor to consider their own results and provide case studies (such as the above) to USAG for publication to share knowledge.

Where the strike occurred- Location type

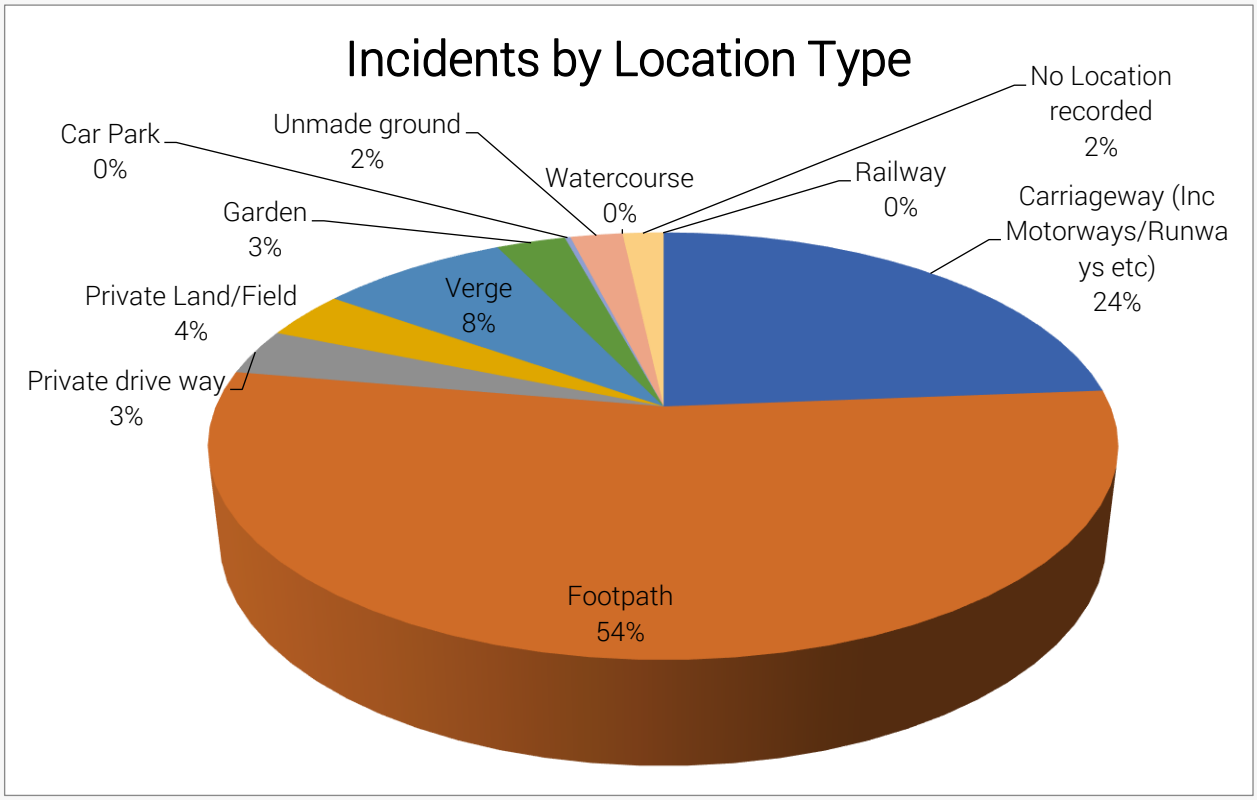

Figure 6: Percentage of strikes by location in 2019

The results here show a significant change from previous years. With over 54% of strikes (almost double previous years), the footpath is the clear area of concern, followed by 24% in the carriageway (an increase from 17% in 2018). This year over 78% of strikes reported took place in footpaths and carriageways.

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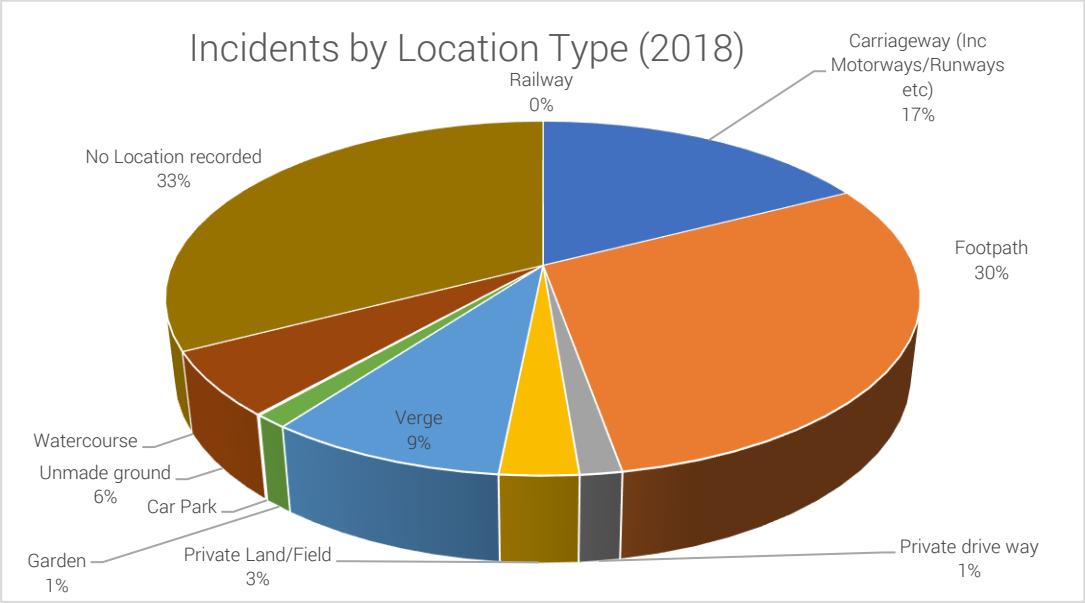
Whilst a significant increase, it is not entirely unexpected as this is where most utilities are located, being a congested area with many utilities and a higher risk of shallower utilities. Much of the excavation works undertaken across the industry to carry out the installation or repair of utilities is therefore within these 'high risk' areas. It could be that the fibre rollout works has meant more work in the footpath (and therefore more strikes) so this will be an area to focus on in future years as this work is likely to increase.

For reference, the 2018 data is shown here:



Guideline industry recommendations

1. Be aware that the footpath and carriageway are higher risk areas due to there being many utilities located in these areas.

   There is likely to be:

   i. Higher density of utilities

   ii. Shallower utilities

   iii. Smaller utility services that are both more difficult to locate and often not mapped.

   iv. The working area is likely to be smaller in size with more interactions with the public.

   Each contributor should adapt their procedures accordingly in line with USAG Best Practice and plan their works accordingly.

2. Almost 1000 strikes did not have this information recorded or were recorded with terminology that was not consistent with the USAG definitions so could not be counted; please ensure that data is submitted in the correct format to support the analysis.
3. Each contributor to consider their own results and provide commentary.

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How the asset was damaged - Equipment used

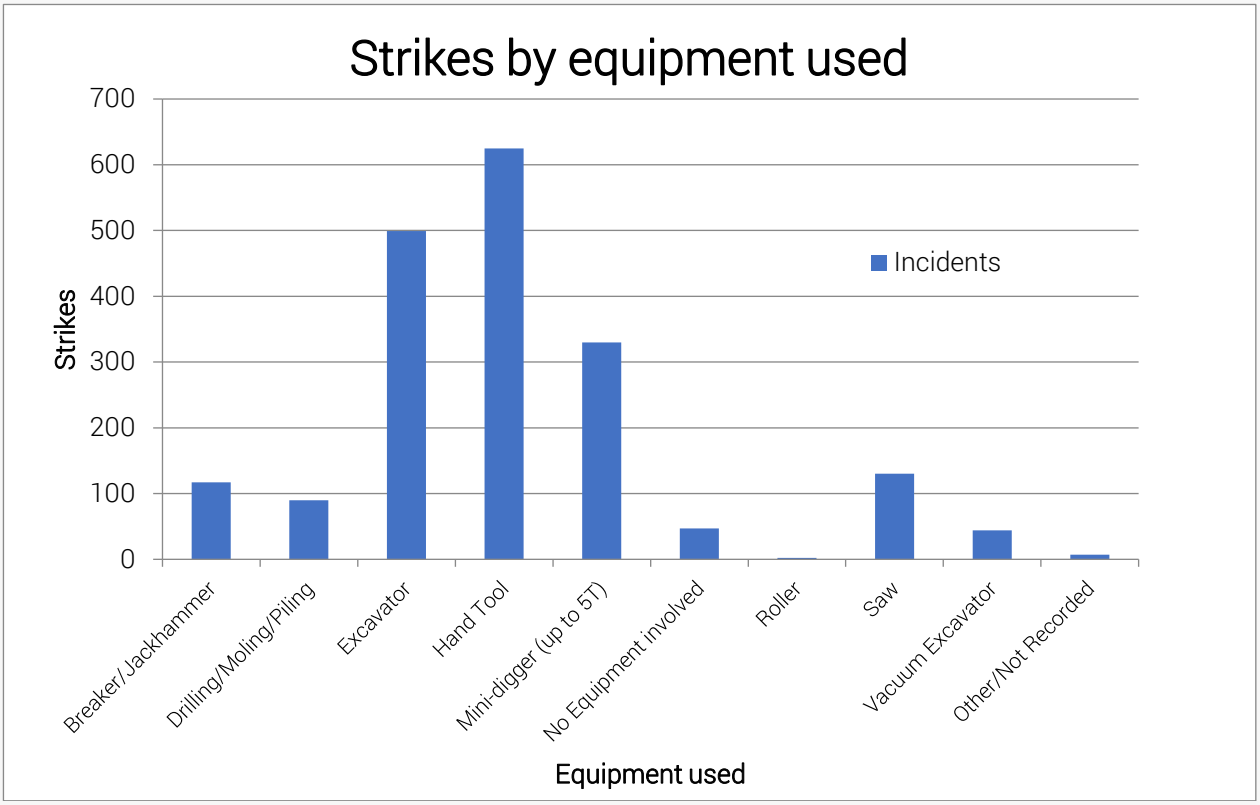

Figure 7: Number of strikes by equipment used in 2019

Hand Tools, Mini-diggers and Excavators continue the consistent trend of the highest numbers for the type of equipment being used when a strike event occurred. This is likely to be as a result of them being the most used pieces of equipment across the industry.

Combining 'excavator' and 'mini digger' as one source (i.e. mechanical excavation) resulted in them again being marginally the highest source of strikes compared to using hand tools.

The continual presence of saws is very concerning as this is likely to suggest that the assets struck must have been laid close to the surface with the operative extremely close to the incident. This is something that should be considered every time an operative uses that equipment as many would not expect assets to be that shallow.

Another thing that was interesting to note was the use of vacuum excavators; something which, when used correctly, are very effective tools but the increase of strikes reported from 9 in 2018 to 44 this year is an area of concern. There is a common misconception that these are used to excavate rather than extract material/spoil - when used correctly they should only be removing the loosened material from an excavation rather than breaking ground.

We then looked at the results of the equipment used in each location.

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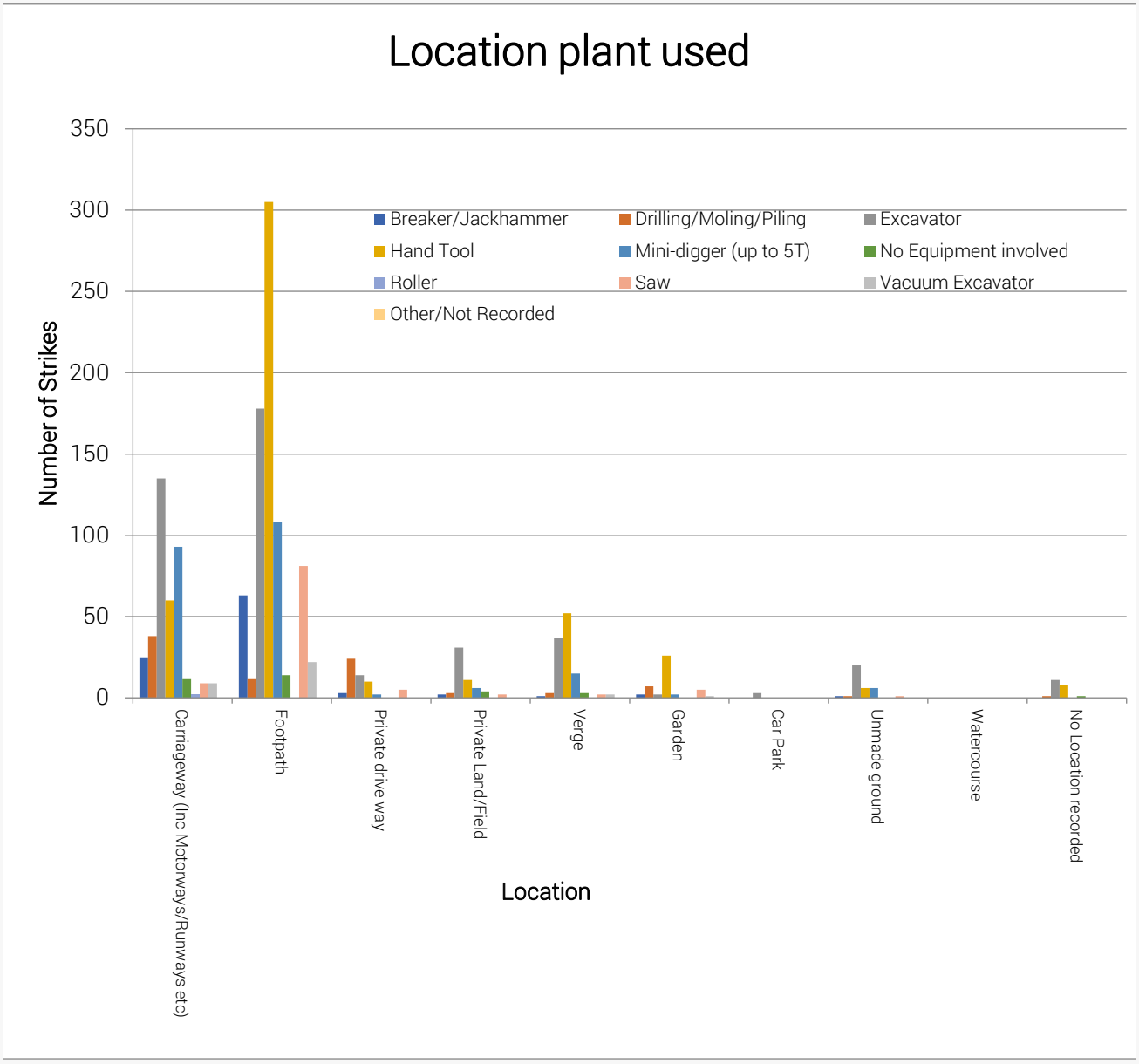

Figure 8: Number of strikes by equipment used and location in 2019

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This showed two key results:

1. The use of hand tools in the footpath was again the key contributor.

   It is a significant concern how hand tools continue to cause such a high proportion of damages. Whilst hand tools are the most used equipment, training or addressing behavioural issues may well reduce the strike incidents caused by the use (or misuse) of hand tools.

2. Excavators in the footpaths (and then carriageway) were the second (and third) highest contributors, with a marked increase of strikes in the footpath where an excavator was used.

Guideline industry recommendations

1. Through the risk assessment process, ensure that the correct excavation methods are used for the area that the works are taking place.
   a) Consider alternative excavation practices, e.g. vacuum excavation and similar to reduce strikes.
2. Be aware when using the equipment that is involved with more strikes and ensure that guidance is in place to mitigate the factors above.
3. Where hand digging is used,
   a) consider the guidelines given to staff, e.g. foot pressure only to reduce the number of strikes.
   b) consider the protective equipment (e.g. insulated spades) when hand digging.
   c) ensure appropriate PPE is worn by all employees
4. Consider risks to operatives by ensuring that there is sufficient training using specific types of equipment and procedures put in place are followed. Although there is more control with hand tools, there can be a much higher risk of injury to personnel when they come into contact with a utility (e.g. road saws as discussed previously).
5. Each contributor to consider their own results and working areas and to provide opinion.
6. Work to the requirements of HSG47 as minimum legal requirements and follow safe dig practices to reduce strikes. This includes the continued use of the CAT (Cable Avoidance Tool) and Genny by a competent person.
7. Strive towards innovative solutions including better engagement with key suppliers/stakeholders.
8. Share case studies of successful implementation.

N.B. Machine controls, augmented reality and future developments are improving but until we have enough confidence in the data accuracy, we must continue to improve practices.

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What asset was damaged- Asset type

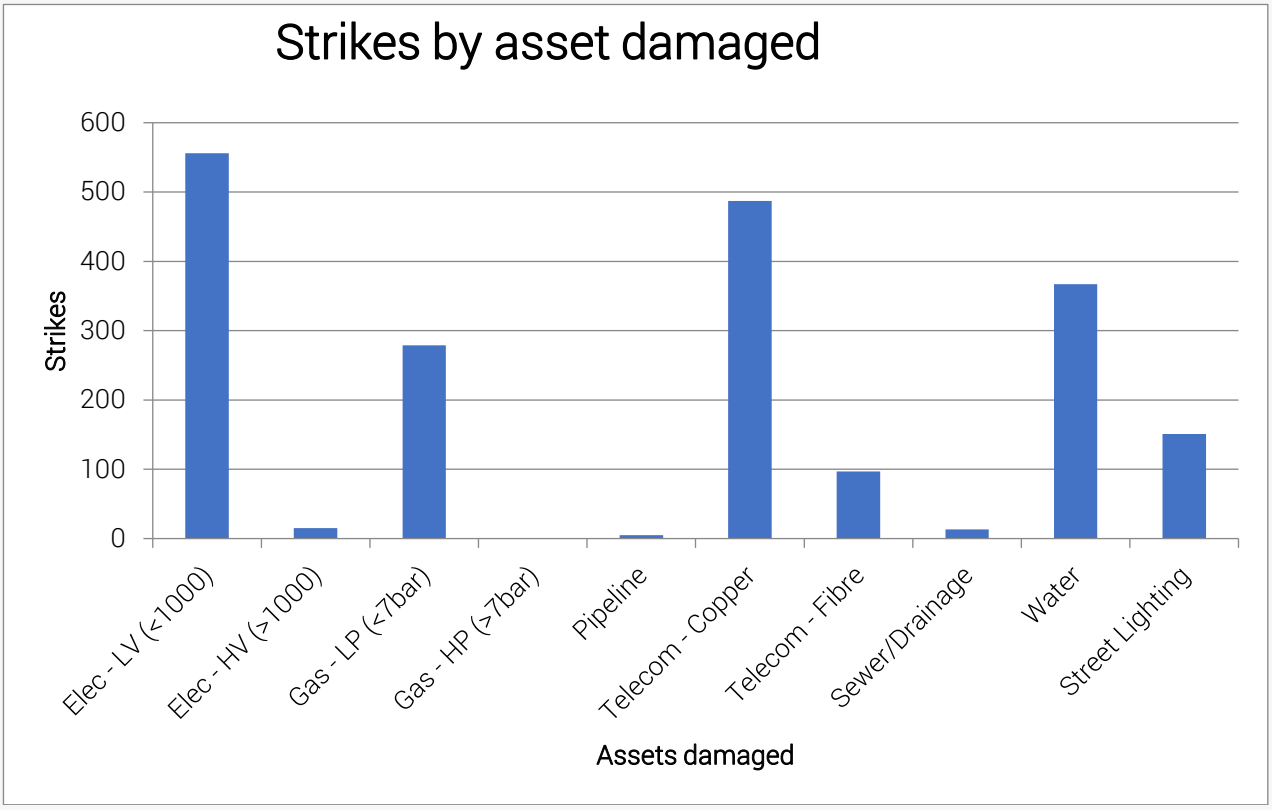

Figure 9: Number of strikes by asset damaged in 2019

The highest volume of strikes is again low voltage (LV) electricity cables (<1000V), which, whilst classified separately to street lighting cables, is likely to include a proportion of them. These types of cable are widespread, often located in footpaths and can be shallow. They can be perceived as more difficult to locate as they don't always have a current running through them (but this can be overcome by using the Genny appropriately).

Low pressure (LP) gas, as a proportion of strikes, reduced again, whilst telecom and water assets increased - also a theme continuing from the previous two years. The increase of telecom strikes is not overly surprising due to increased network rollout. Interestingly, there were several sets of strike data supplied that did not use the correct terminology and could not be used - many of these were related to Telecoms which would have increased it further. A worrying trend for the future are increasing reports of telecoms assets being deployed rapidly without sufficient surface features to warn of their existence, together with being laid at shallow depths.

Strikes to the Telecoms networks (Copper and Fibre) are likely to be common due to being shallow and difficult to locate on site, either as a result of the material of the asset or access to chambers to generate a signal. It could possibly be as a result of inconsistent use of the Genny which is vital to be used and must be emphasised to all site personnel. Other specialist technologies exist which can help alleviate these issues and should be encouraged to be used on site where possible.

Low pressure (LP) gas and water (often PE pipes and service connections) suffered significant volumes of strikes. This is likely due to both poorer standards of mapping (not shown on most plans) and locating difficulties with equipment typically used on site. CAT and Genny cannot detect PE utilities without being able to insert a device known as a "Sonde" up the inside of the pipe which is usually not practical with pressurised pipework. Small diameter PE pipework may not be detectable at the depth buried with GPR either, but often the trench can be seen where the pipe was laid.

We then looked at the location type for each asset damaged:

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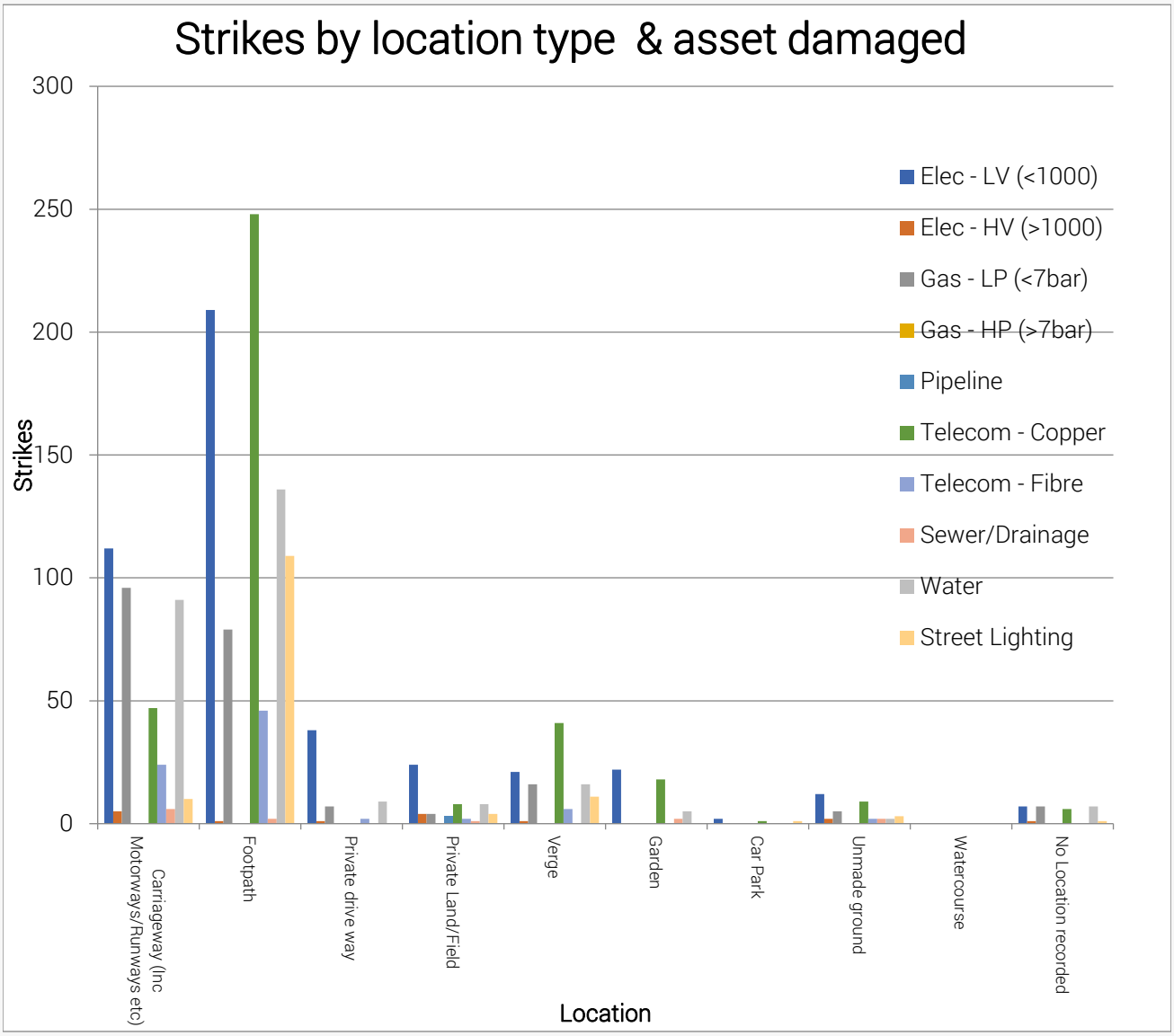

Figure 10: Number of strikes by asset damaged and location type in 2019

These results suggested that:

1. There has been a significant spike in Telecom strikes in the footpath and for the first time, these have been the highest single combination.
2. LV electricity cables in the footpath are now the second most likely assets to suffer a strike.
3. Water assets in the footpath have also had a marked rise from previous years.

Note: Due to the increased protection on High Voltage cables, Low Voltage cables are more dangerous to work around as they are less likely to trip off.

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We then looked at the equipment used for each asset damaged:

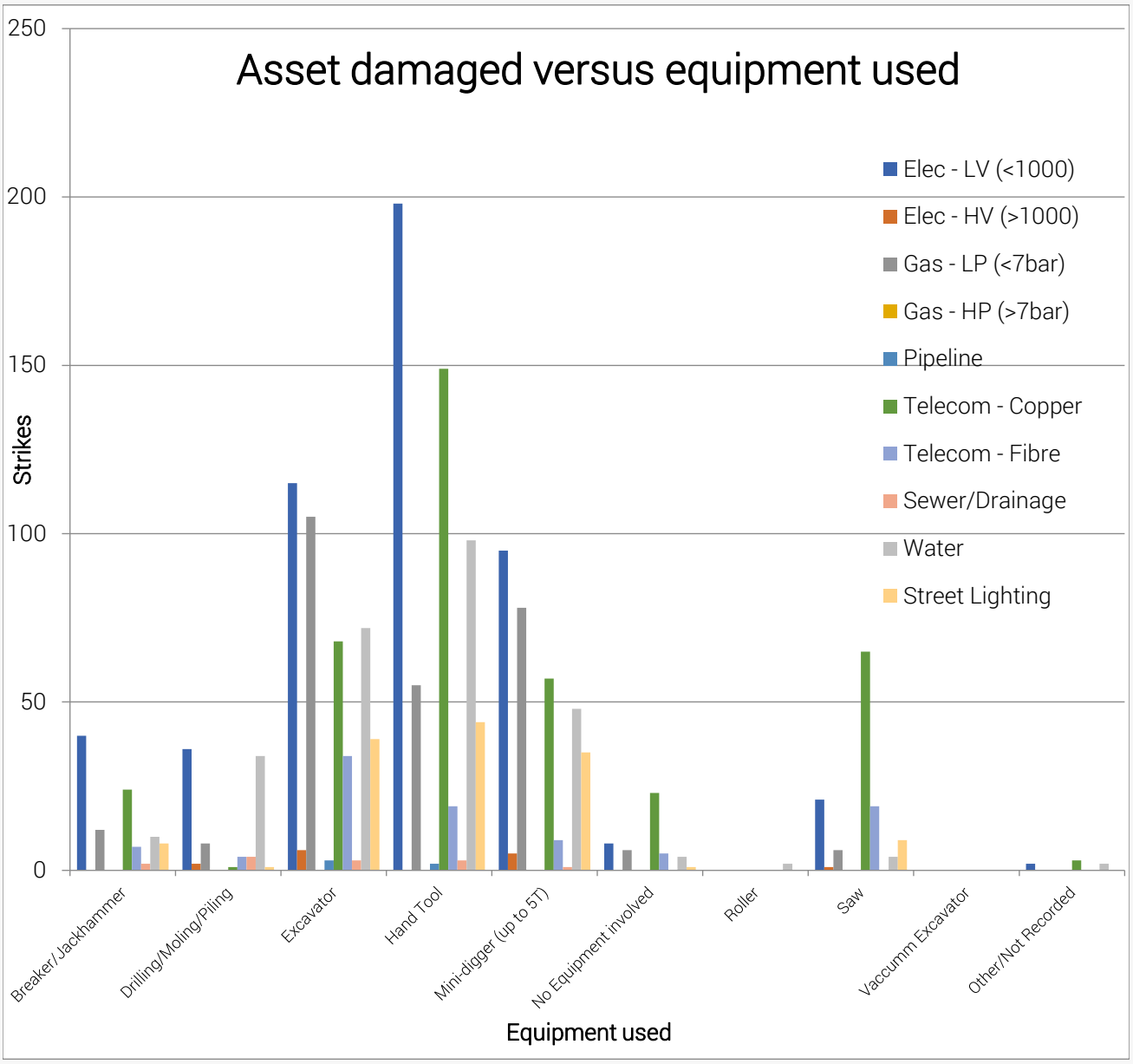

Figure 11: Number of strikes by asset damaged and equipment used in 2019

As has always been the case in our USAG reports, LV Electricity was the asset struck most regularly by a specific piece of equipment which was 'hand tools'. Whether or not the strike resulted in significant damage, this represents a significant risk for operatives undertaking this work. This is in line with findings by Metje et al. (2017). There has also been an increase in strikes on the LV network when using excavators, whilst a decrease in LP gas strikes.

There has been a large increase in telecom strikes, with strikes by hand tools, excavator and saws making three of the top ten combinations.

The Top 4 types of utilities struck of Electric (LV), Gas (LP), Water and Telecom (Copper) has not changed since we started these reports in 2013.

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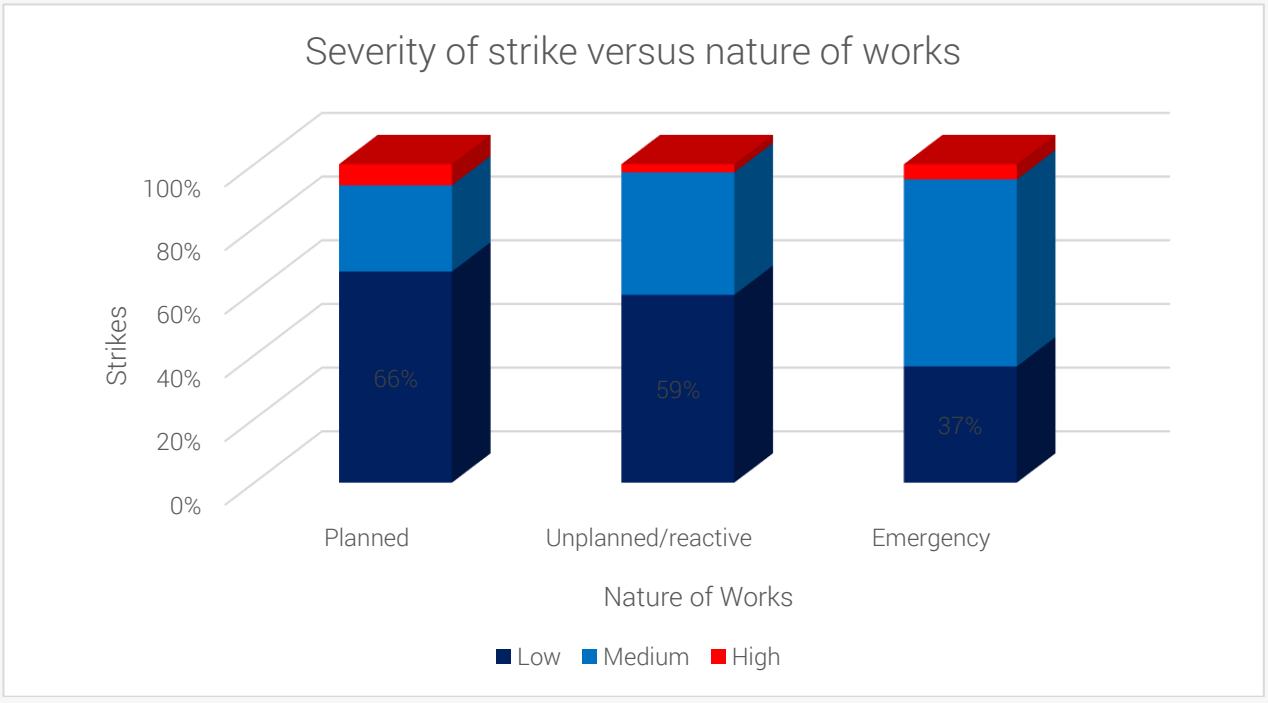
Guideline industry recommendations

1. It appears that many assets which require more effort to accurately locate on site (some LV electricity, low pressure gas, telecoms and water) were hit most often. The following would therefore be sensible:
    a) Ensure plans of all known services are collated before works commence
        i) Clear plans will help but must not be solely relied upon due to the unknown level of accuracy.
        ii) Any cross sections available should be referenced and verified by trial hole
        iii) Plans to be in colour
    b) Undertake high quality surveys to locate assets (recommended to be PAS128 QL-B compliant levels as a minimum)
    c) Ensure that the Genny is used when using the Locator
    d) Encourage the use of CAT & Genny data logging software as this has resulted in a positive change in behaviour and a reduction in strike incidents for several organisations.
    e) Develop locator training to understand why a CAT doesn't always show the utility in the correct location in congested areas and how to mitigate this to improve competency on site.
    f) Consider/research the new technology available as mentioned above as recent developments are understood to have significantly reduced costs of this technology.
2. Be aware of the risks associated with using hand tools incorrectly and fully risk assess the site.
3. Please refer to Cause of Damage Recommendations: Why the asset was damaged- strike cause (planning) and Why the asset was damaged- strike cause (execution).
4. Notify asset owners of any variance between asset information found and that issued.

The severity of strike and nature of works undertaken



Strikes by Nature of Works		Severity of Strike		
Nature of Works	Strikes	Low	Medium	High
Planned	1875	66%	27%	7%
Unplanned/reactive	80	59%	38%	3%
Emergency	63	37%	59%	5%

Figure 12 & Table 1: Number of strikes by nature of works and severity of strikes in 2019

The majority of strikes reported were defined as low severity which is not surprising due to the likely nature of most works being undertaken. Figure 12 shows the profile of the three work categories in numbers and percentage terms for planned, unplanned/reactive and emergency across the two years:

- The planned column shows the highest percentage of low risk strikes out of the three samples, with also a slightly higher proportion of high risk strikes.

  For planned works, one would assume the highest proportion of low severity strikes and very few high-risk strikes. This possibly highlights a need for better planning, less generic/more site specific method statements and risk assessments withmore reliance on survey results and better briefing.

- The unplanned/reactive column shows an increased risk, with 41% being either medium or high risk, compared to 34% for planned works.
- The emergency works show a much greater likelihood of medium or high risk strikes, with the majority (64%) being medium or high risk. This could be due to reduced timescales, although all other aspects of work must remain the same unless immediate risk to life or limb. This highlights the importance of planning.

Guideline industry recommendations

1. Be aware that emergency works are showing a much higher risk and therefore ensure that robust systems of safe working are in place and briefed to the team.
2. Be aware that works across all types are still leading to a variety of strike risks, with even planned works having high rates of high-risk strikes.
3. Each contributor to consider their own results and provide commentary.

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Why the asset was damaged- strike cause (planning)

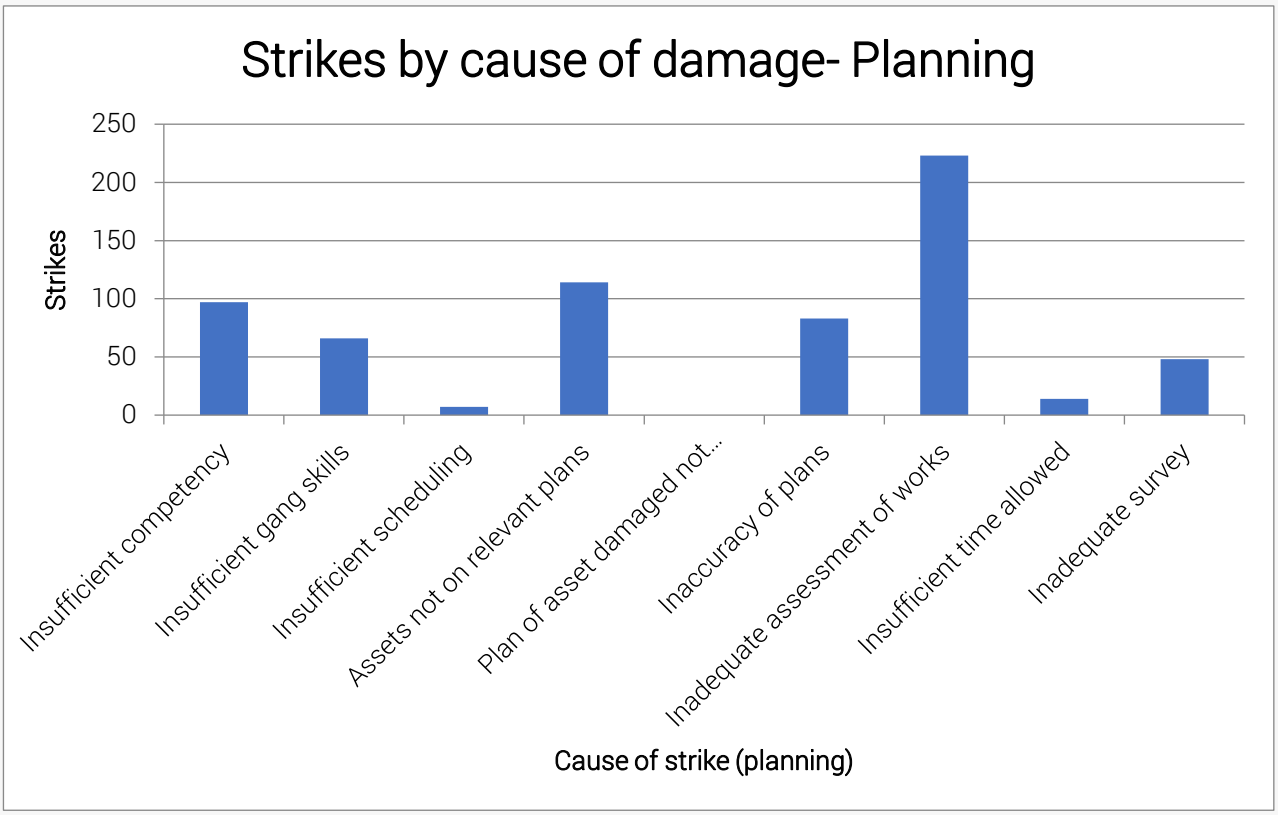

Figure 13: Number of strikes by cause of damage (planning) in 2019

This section is opinion/judgement based and that must be considered compared to other sections which are based on facts. Please be aware that the root causes of each strike could be in multiple areas but only one is asked for in the request.

Inadequate assessment of works and associated risks, which has been the highest cause since 2017, has grown significantly. Issues with utility plans (across multiple options) were much reduced this year.

What this tells us is that the assessment of the work is fundamental to the success. Whilst this is quite wide ranging, it does suggest that what is available is sufficient but not being used to the extent required.

Improving asset record data would still help rectify two of the top four causes so this should remain an important area for asset owners to focus on. However, no matter how accurate the asset owners states their information is it should always be verified on site as accuracy decreases over time due to plate tectonics and ground movement.

Guideline industry recommendations

1. Focus on improving the information available before works on site commence through the following processes:
    a) Ensuring all utility record plans available are present on site, referencing industry guidance, e.g. HSG47 and combine with effective site reconnaissance.
    b) Undertake high quality PAS128 level surveys to locate assets, including the use of appropriate locating methodologies through the pre-construction phase.
    c) Be aware of the potential inaccuracies of statutory utility records

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d) Design out the risk, where possible and mitigate remaining risks.

2. Asset owners to ensure plans are as high quality and accuracy as possible and readily available to those undertaking works.
3. Before any activity is undertaken that breaks the surface of the ground a permit to dig must be issued. The permit system is designed to ensure that only competent and authorised people conduct the task and that adequate consideration of risk has been taken.
4. Work to the requirements of HSG47 as a legal minimum and follow safe dig practices to reduce strikes.
5. Each contributor to consider their own results against those reported.
6. Asset owners to be informed when their assets are not in the location shown on their plans. The recent PAS256 guidance for reporting such assets is recommended, a free version being available at https://www.linesearchbeforeudig.co.uk/linesearchbeforeudig-support).

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Why the asset was damaged- strike cause (execution)

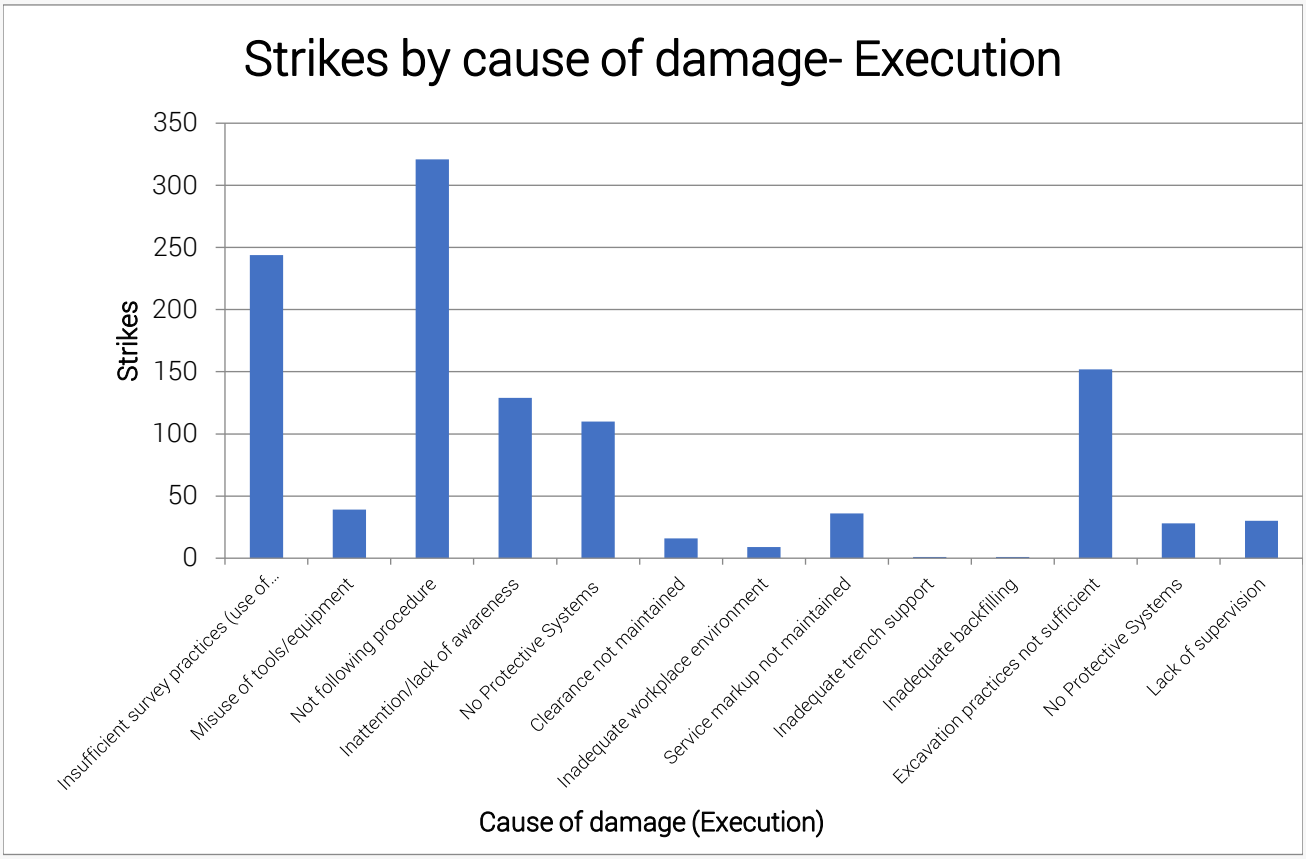

Figure 14: Number of strikes by cause of damage (execution) in 2019

This section is again opinion/judgement based and that must be considered compared to other sections which are based on facts.

Not following procedure has risen from a distant second in 2018 to a clear leader in 2019, with insufficient survey practices in second and excavation practices not sufficient as third. This could be as a result of a number of aspects including a lack of training, operator behaviour, familiarisation with standards, lack of adequate supervision and the need for better quality procedures across the industry- not just in policies but also out on site. A large proportion could be remedied without needing any enhanced standards or quality of equipment but just by following their own rules.

Insufficient survey practices (use of locating equipment) remain critical and suggests that better surveying during execution would reduce strikes. Data logging of the use of locating equipment has been proven by several organisations to reduce strikes (by improving behaviour) so is certainly a potential method to improve locating standards on site. Each contributor may also want to consider using specialist survey companies where appropriate to improve this aspect. Due to the congestion of utilities in the footpath and the number of utility strikes there, footpaths should be considered higher risk and therefore best placed for professional surveys. (Reducing Damage to Underground Utility Infrastructure during Excavation Costs, benefits, technical advances, case studies, and recommendations Prepared for the Geospatial Information & Technology Association By Geoff Zeiss and Sakura Shinoaki)

Please be aware that only one root cause of each strike (in planning and execution) is asked for but there could be multiple causes.

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Guideline industry recommendations

1. Focus on improving the behavioural activity on site during works with the following recommendations:
    a) Checking different performance with different gangs.
    b) Improved/accredited training courses that focus on excavating around/adjacent to utility assets.
    c) Undertaking interviews and site team competency audits with behaviour as the focus area.
2. Improve locating practices by competent personnel.
    a) Consider data logging of locator use on site.
3. Each contributor to consider their own results against those reported.
4. Work to the requirements of HSG47 as a legal minimum and follow safe dig practices to reduce strikes.

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4.0 Conclusions

We hope that the report has been informative with respect to the trends, analysis and guideline recommendations discussed.

Whilst we have had more strikes reported than in previous years, we need more reporting of strikes in the coming years to help develop the analysis given and conclusions made, as well as better adherence to the options of each category. This will be most effective by having a greater understanding of the volume of works undertaken across the industry and when and where these works are undertaken to allow benchmarking. By having more data to analyse we can continue to improve the usefulness and value of the report.

Many contractors may be reducing the strike rates within their organisations as a result of internal awareness campaigns and drive to improve so case studies will be shared wherever possible.

Please help us do this by forwarding the 2020 data request spreadsheets to your relevant team members; with enough data we can emulate the success of the US DIRT (Damage Information Reporting Tool) available here: Link to report.

Recommendations for future reports

Keep it simple and encourage more data to be supplied in the correct format by the large utility companies and their contractors.

USAG Members must submit data in the correct format as this is a requirement of the USAG Charter.

Cost of strikes

The stark and obvious costs are the costs of injury and harm to individuals working around utility networks. On top of this, the financial costs are important to discuss.

Based on an estimated value of £3600 per strike (gathered from previous reports), the total direct costs of strikes reported for 2019 is approximately £9.3 million - this increase is based on more successful data input from the USAG membership.

Once indirect costs including project overrun, traffic delays, downtime, back office time and social costs such as loss of productivity to businesses are taken into account the true cost of a utility strike increases significantly.

Based on a report recently undertaken entitled "What do Utility Strikes Really Cost?", for 16 case studies in an urban area, it was shown that for every £1 spend on the direct cost, £29 is spent on the indirect and social costs. Based on the above estimated direct costs from previous reports, this results in the average true cost of each utility strike of over £100,000.

Reference: Makana L, Metje N, Jefferson I & Rogers CDF (2018). What Do Utility Strikes Really Cost? Report prepared for Transport for London, School of Engineering, University of Birmingham, Birmingham, UK.

Taking consideration of the indirect costs, the total value of all the strikes reported in this report exceeds £270 million. We need all industry stakeholders to continue the improvements to better understand the UK total figure.

Submitting the data for 2020

Submission of data is now a condition of the USAG Charter in the interests of all.

We leave you with seven takeaway points for digestion and look forward to receiving the data for 2019 to data@utilitystrikeavoidancegroup.org. Thank you.

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7 takeaway points

1. We need more industry data to draw better conclusions and allow better benchmarking – more contributors and more completed data sets
    - That data should be complete and in accordance with the USAG format
2. The most effective single change would be for stakeholders to follow their own guidance more often, using the equipment and processes available.
3. Asset owners to improve quality, accuracy and access to asset data- in particular the telecoms and water industry who have suffered the highest increase in strikes
4. Undertakers of works (designer & contractor) to use the plans more effectively in accordance with industry recognised survey practices.
5. Surveying procedures on site must improve, both by better in-house standards and the use of professional surveying companies where required.
6. Educate operatives of the report conclusions and those that present the most risk to them. Such messages may include the most usual assets struck, where they are, what is usually being used and when it happens- this information will help those undertaking the excavations understand the risks better.
7. Any known discrepancies on site to be recorded and shared with the relevant asset owner to improve records for future excavations.

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5.0 Appendices

Appendix 1 – About USAG

Appendix 2 – Definitions

Appendix 3 – Strike Data Template

Appendix 5 – Data Categories

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Appendix 1 - About USAG

The Utility Strike Avoidance Group (USAG) is the established body within the utility, excavation and construction industries to reduce the number and severity of underground utility strikes arising from work activities in proximity to such services.

The primary role of USAG is to provide a forum for employers and industry partners to influence and promote improved standards of health and safety within the utility sector. It has become the leading provider of industry knowledge for safe excavation around utilities and as such has been endorsed by both the HSE and IOSH. It was the winner of the Innovation award for the NJUG Awards in 2012 and the USAG Charter currently has circa 290 signatories.

Terms of Reference

The primary role of USAG is to provide a forum for employers and industry partners to influence and promote improved standards of health and safety within the utility and construction industries.

This will include:

- ✓ The development of a consistent approach by all members to ensure that legal duties are complied with as an absolute minimum;
- ✓ The sharing and promotion of good practice in all work activities carried out in proximity of utility services;
- ✓ The support of industry initiatives and campaigns designed to reduce the incidence of utility strikes;
- ✓ The promotion of the reporting and analysis of annual data from all USAG members to identify any industry trends with a view to developing responsive actions;
- ✓ The maintenance of close liaison with other relevant groups within the utility sector;
- ✓ The maintenance of close dialogue with HSE and other relevant regulatory bodies and stakeholders as necessary;
- ✓ Raising awareness amongst other parties including designers, training providers and equipment manufacturers of Their responsibilities for and influence on the provision of utility services;
- ✓ The identification of new and emerging hazards and risks;
- ✓ The development and promotion of industry wide programmes and initiatives and relevant guidance as necessary to promote training and skills related issues.

Aims & Objectives

USAG has the following aims and objectives:

- ✓ To manage and oversee all information published within the USAG framework of working groups;
- ✓ To ensure duties under health and safety legislation are implemented consistently by all partners and to discuss and assess the impact of and application of draft legislation;
- ✓ To promote health and safety practice throughout the utility and construction industries via an agreed programme of work, to be kept under regular review;
- ✓ To share and exchange any other relevant information affecting the utility and construction industries;
- ✓ To provide a forum for HSE to raise issues of operational policy that may impact on the represented industries.

Working Groups

To deliver the aims above, USAG has three main working groups:

- Toolkit Development
- Data & Reporting
- Training & Competence

These groups are supported by Communication, Website Development and Membership teams who support the overall delivery of the USAG groups.

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How to become involved

USAG is always looking for additional members/participants so if you would like to become involved please visit www.utilitystrikeavoidancegroup.org where you can:

1. Download the USAG Charter – This Charter is designed to help change the way we all work around utilities and to set a minimum standard for adoption across the industry.
2. View and download our Toolkit, the toolkit includes section for:

   - ✓ Planning
   - ✓ Responsibilities
   - ✓ Training
   - ✓ Permits, Calibration and Daily Inspection
   - ✓ Key Risk Guidance
   - ✓ Personal Protection
   - ✓ Investigation Process and Record

   View previous strike reports and related information.

3. Contact us via email; data@utilitystrikeavoidancegroup.org

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Appendix 2 – Definitions

Utility Strike: Any service (as defined below) damaged during works involving drilling, excavation/backfilling or heavy loads where sheath or protective wrap has been pierced or damaged, or the service has been severed, crushed or dented. This also applies to services that are damaged if the asset owner hasn't given express written permission to break them out.

Proposed: "Any physical damage to a utility asset caused by any activity".

Near miss: Where a utility strike was narrowly avoided or could have happened but by sheer good fortune didn't occur.

Service: Any above or below ground cables (telecoms, data, control cables, electricity (all voltages)), pipes (gas, district heating systems (all temps), water, sewer, fuel, oil), ducting and drains including any associated features or unidentified utilities either individually or collectively within containment.

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Appendix 3 – Strike Data Templates

USAG REQUEST FOR 2019 UTILITY STRIKE INFORMATION

Date of Incident	Time of day	Closest Town	County	Environment	Location Type	Asset Damaged	Asset Type	Service interruption (Y/N)	Severity of Strike	Cause of Damage - Planning	Cause of Damage - Execution	Equipment used	Nature of Works	Excavator Group	Survey Level

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Appendix 4 – Data Categories

Data Categories

Location of works (town)

Type	Description
Town	The nearest town to the utility strike or part of City, eg. Westminster.

Location of works (county)

Type	Description
County	The county within which the utility strike occurred.

Environment of works

Type	Description
Inner City	A typically highly congested area in the middle of a city
Suburbs	The outer reaches of a City
Town	A typical town environment
Village	A typical village environment
Urban/Industrial	An urban or industrial area out of town, such as a Business Park where services are likely to be less congested
Rural	A typical rural setting
Other	Including other environments such as airports, barracks, hospitals etc.

Location Type

Type	Description
Carriageway (Inc Motorways/Runways etc)	A constructed surface used by motor vehicles or airplanes
Footpath	A constructed surface used for walking by pedestrians
Garden	A privately owned area of land next to a house
Private drive way	A vehicular access to a house
Private Land/Field	An enclosed area of land predominantly in agricultural use
Car Park	An area dedicated to vehicle parking
Railway	An area of land dedicated to use by trains
Unmade ground	An unconstructed/temporary surface used for vehicular access or parking
Verge	A grassed area located adjacent to footpath or carriageway.
Watercourse	Any watercourse including rivers, streams, ditches etc and their banks
No Location recorded	Location not reported

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Equipment Type

Type	Description
Breaker/Jackhammer	A hand held pneumatic or electro mechanical tool used to break up hard surfaces eg concrete, pavements, road surfaces
Drilling/Moling/Piling	Method of construction being used
Excavator	Tracked or wheeled mechanical plant above 5T using a bucket or similar attachment fixed to a boom to carry out excavation activity
Hand Tool	A hand held tool used to excavate eg graft, spade, shovel
Micro/narrow trenching	An excavation process used to excavate a narrow trench to lay assets (predominantly fibre) in the ground.
Mini-digger (up to 5T)	A small excavator less than 5T
No Equipment involved	Reported incident caused by no equipment eg falling spoil/material
Roller	Plant used to compact backfill material
Saw	Plant used to cut through footpath/carriageway surface eg stihl saw, road saw
Vacuum Excavator	Plant used to remove granular material from trenches and around pipes and cables by use of powerful suction
Other/Not Recorded	Incident with either bespoke/non-standard equipment or no equipment reported

Nature of works

Type	Description
Planned	Works that have been planned/scheduled in advance
Unplanned/reactive	Works of an urgent nature- potholes, leaks etc to restore services to meet customer service targets etc.
Emergency	Work that needs to be done immediately to repair damaged services in order to prevent continuing risks to health and safety either directly, such as stopping a gas leak, or indirectly where restoring power to traffic signals at a major junction. It does not mean restoration of service to meet customer service targets. (Definition as per HSG47)

Excavator Group

Type	Description
Contractor	N/A
Sub Contractor	N/A
Developer	N/A
Government	N/A
Occupant/Farmer	N/A
Other	N/A
Utility	N/A

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Asset Damaged

Type	Description
Elec - LV (<1000)	An electrical service cable carrying a load of up to 1000v not including street lighting cables
Elec - HV (>1000)	An electrical service cable carrying a load above 1000v
Elec – Street Lighting Cable	A cable supplying electricity to street lighting columns
Gas - LP (<7bar)	A gas pipe which operates up to a pressure of 7 bar
Gas - HP (>7bar)	A gas pipe which operates over a pressure of 7 bar
Pipeline	A pipe that conveys fuel e.g. oil
Telecom - Copper	A telecommunication cable
Telecom - Fibre	A telecommunication fibre optic cable
Sewer/Drainage	A pipe that conveys waste, surface or combined water flows
Water	A water pipe that conveys potable or raw water.

Asset Type

Type	Description
Main	An underground principal utility
Service	An underground supply from the principal utility to the end User
Overhead	Any service suspended on pylons, poles etc.

Service Interruption

Type	Description
Yes	Any interruption in supply
No	No interruption in supply

Severity of Strike

Type	Description
If any classification of the strike is in a more serious classification then the highest classification should be used. i.e. if no injuries (LOW) but major delays (HIGH) then it should be classified as HIGH.	
Low	None / minor injuries None/ minor delays or disruption incurred No interruption to supply
Medium	Reportable injury Significant delays or disruption incurred Minor interruption to supply
High	Serious / fatal injuries Major delays or disruption incurred Threat to public safety Media coverage Significant interruption to supply

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Equipment Type

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Excavator Group

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Government	N/A
Occupant/Farmer	N/A
Other	N/A
Utility	N/A

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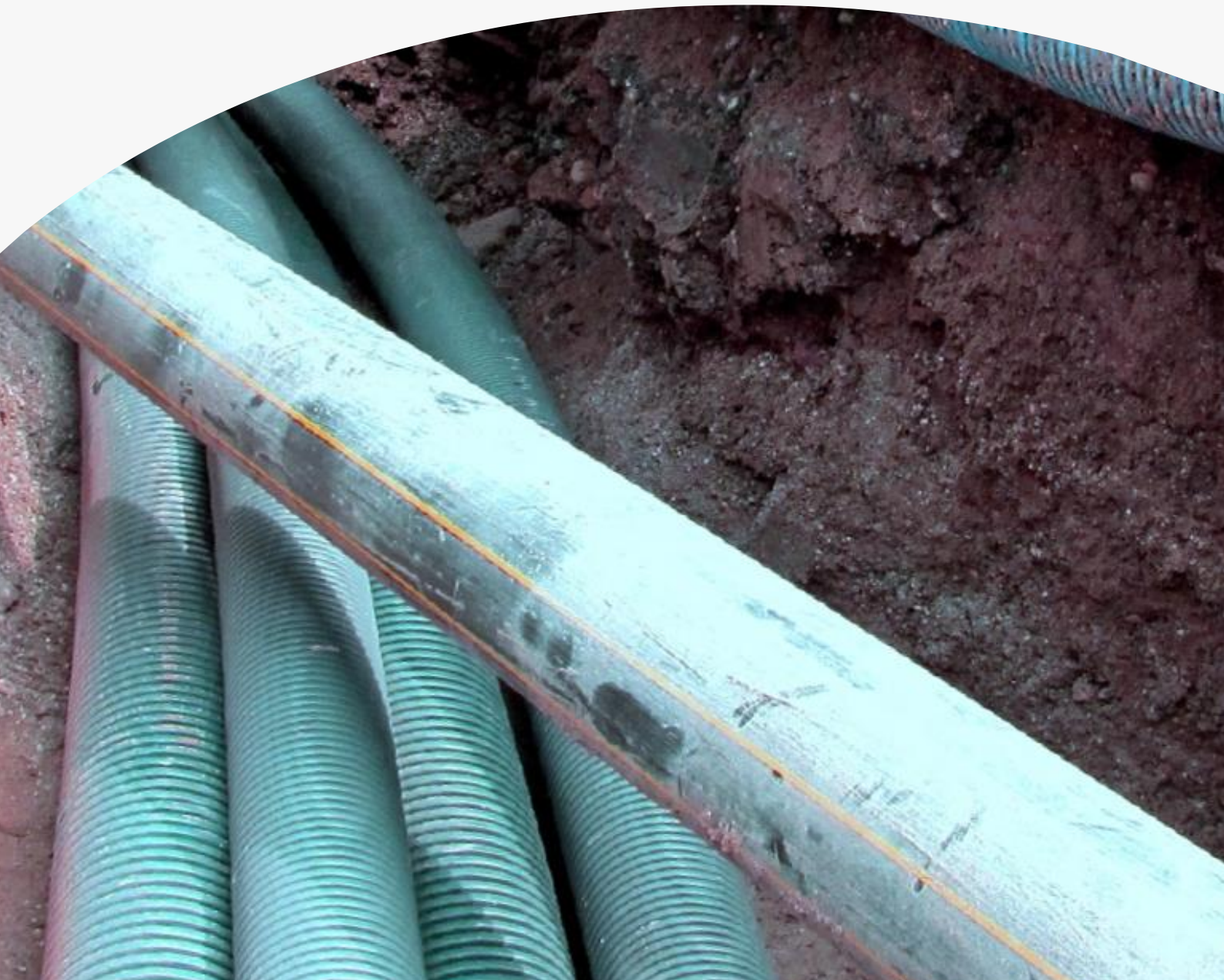
Cause of Damage- Planning

Type	Description
Insufficient competency	Insufficient competency, including training and experience
Insufficient gang skills	Insufficient skills of gang chosen
Insufficient scheduling	Insufficient scheduling of activities
Assets not on relevant plans	Plans of relevant utility did not show utility asset damaged
Plan of damaged asset not present	Plans of utility damaged not present
Inaccuracy of plans	Utility asset damaged not shown correctly on plans on site
Inadequate assessment of works	Insufficient assessment of works required including not sufficient equipment provided etc
Insufficient time allowed	Insufficient time allowed to complete works in given timeframe
Inadequate survey	Survey practices not sufficient

Cause of Damage- Execution

Type	Description
Insufficient survey practices (use of locating equipment)	Inadequate use of locating equipment
Misuse of tools/equipment	Inappropriate/misuse of plant, tools or equipment
Not following procedure	Identified that Company Procedures were not being fully followed by individual or by group
Inattention/lack of awareness	Followed Company Procedures but adjudged as human error
Clearance not maintained	Recommended HSG47 guideline separation distance between plant and utility not followed
Inadequate workplace environment	Congested or poorly laid out workplace environment (not relating to density of services) including congested or restricted motion or inadequate or excessive illumination
Service markup not maintained	Marks identifying utility location taken out during excavation and not re-marked
Inadequate trench support	Trench not properly supported or trench support causing damage to utility
Inadequate backfilling	Backfilling of excavation/trench causing damage to utility
Excavation practices not sufficient	No or inadequate development/ implementation/enforcement of Safe System of Work
No Protective Systems	No or inadequate guards or protective systems
Lack of supervision	For non-use of a banksman or similar.

Survey Level

Type	Description
Type D	Desktop records utility search (in accordance with PAS128)
Type C	Site reconnaissance to identify physical features that support the existence of utilities within the survey area (in accordance with PAS128)
Type B	Geophysical techniques to detect and identify utilities within the survey area with a minimum of two techniques being GPR and electromagnetic locating (in accordance with PAS128)
Type A	Verification comprising exposing the utility within the survey area to confirm and record the location and other attribute data (trial holes etc) (in accordance with PAS128)
Non PAS128	A type of search not in accordance with PAS128.

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