

ULSTER ARCHAEOLOGICAL SOCIETY



HEALTH AND SAFETY AND WELFARE MANUAL

HENRY WELSH

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First published 2017

Ulster Archaeological Society

c/o School of Natural and Built Environment

The Queen's University of Belfast

Belfast

BT7 1NN

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1. INTRODUCTION

This is the health, safety and welfare information manual of the Survey Group of the Ulster Archaeological Society. It has been designed to provide a convenient information source for members and others associated with the Survey Group. It is not intended to be a source of authoritative information, for which the relevant legislation and codes of practice should be consulted.

2. GENERAL STATEMENT OF POLICY

The Ulster Archaeological Society is a voluntary organisation and the activities of the Survey Group are also voluntary and as such, the usual requirements of health and safety legislation do not apply. However, our policy is to provide and maintain safe and healthy conditions, equipment and systems for all our members and to provide such health, safety and welfare information, training and supervision as necessary. We also aim to safeguard the health and safety of other people who may be alongside us during our activities.

The policy will be kept up-to-date. To ensure this, the policy and the way in which it is operated will be reviewed every twelve months.

3. ACCIDENT REPORTING AND INVESTIGATION

In the health and safety arena, the word 'accident' is a generic term covering any safety incidents that occur. This includes incidents in which people are injured or become ill and any 'near miss', where an accident takes place, but people were not actually injured. In the case of incidents where people are injured, these must be reported to the person in charge of the fieldwork at the time and details entered into the site notebook. Notification will also be made to the landowner of the site. All incidents will be investigated and details recorded in the site archive. Formal accident investigation will be carried out by a competent person nominated by the President of the Ulster Archaeological Society. For major incidents, the Health and Safety Executive for Northern Ireland will be notified.

4. AUDIT

All health and safety policies, procedures and documents will be revised by a competent person nominated by the President of the Ulster Archaeological Society on an annual basis. All UAS health,

safety and welfare documentation will be available for inspection by contacting the Honorary Secretary of the Ulster Archaeological Society.

5. EMERGENCY PLAN

This emergency plan is intended to provide guidance for dealing with the repercussions of a major incident while undertaking fieldwork activities and to identify the actions necessary for managing the crisis and restoring critical functions.

MAJOR INCIDENTS

A major incident can be defined as 'an event, which, because of its scale of impact, is beyond the scope of resolution by normal mechanisms of the fieldwork members'. It may require the deployment of some or all of the combined resources of the emergency services and includes:

- Terrorism – bombs, sabotage, arson
- Major fire
- Chemical spillage
- Biological or radiation leak

When such an incident occurs, the emergency services should be informed immediately (**telephone 999**). It is essential that the following information be passed on:

- Exact location of the incident
- The type and extent of the incident (and cause, if known)
- Potential hazards present (such as chemicals/radiation)
- An estimate of the number of people injured/trapped

SERIOUS INCIDENTS

A serious incident is defined as one that:

- May present a real health and safety danger to members of the society and to the general public
- May present a real threat to UAS property or reputation
- May present a danger to the environment or public health
- It should be remembered that a serious incident may well develop into a major incident.
- All reasonably foreseeable hazards should be routinely recorded as part of the health, safety and welfare risk assessment procedure. Site staff should also consider exceptional hazards, such as rivers in flood, proximity to trees in high winds, potential landslips etc., particularly in periods of extreme weather conditions.

PRACTICAL APPLICATION OF THE EMERGENCY PLAN

The key to rapid and successful management of any emergency is pre-planning. The following information should always be readily available at every survey site:

- The exact location where staff members are working – it is essential that the emergency services receive an accurate address and information such as site access routes. A member of staff with high-visibility clothing should be sent to guide emergency vehicles into the site.
- A list of emergency contact numbers:
 - For emergency services (999 or 112 on mobile phones)
 - For all UAS members present
- All members should ensure that mobile phone coverage is in place on-site. The location of the nearest public telephone or private house should also be noted as a back-up.
- Vehicle fuel tanks should be kept topped up as much as possible, in case the vehicles are required to ferry staff to/from site in an emergency.
- A first aid kit should be available at every UAS survey site and contents checked and updated regularly.
- A supply of mains or bottled water should always be available on site.

It should be remembered that UAS staff are neither equipped nor trained to deal with emergency situations, so it is essential to call the emergency services as soon as possible.

DEALING WITH THE PRESS

Staff must be aware that if the press are on site, or if they make contact regarding the incident, they will use various means to obtain comments for publication. Often, unguarded statements are used out of context and reflect badly on the organisation or individual involved. **UAS members should therefore not enter into any dialogue with members of the press and instead refer them to the member in charge of the site work.**

This policy is intended to provide a basic introduction to emergency planning.

6. FIRE SAFETY

The main consideration with regard to fire safety is to evacuate the danger area without delay, as fire spreads very rapidly and you may become trapped sooner than you anticipate.

FIRE ON A FIELDWORK SITE:

- (I) If you discover a fire on site, call the fire brigade immediately (phone 999).
- (II) Evacuate everyone from the vicinity of the fire and stand upwind.
- (III) Do not return to the area unless informed by someone in charge (usually the senior fire officer present).

USE OF FIRE EXTINGUISHERS

- (I) You should not attempt to operate a fire extinguisher unless you need to in order to make your escape. Do not take it upon yourself to extinguish a fire unless you are confident that your escape will not be jeopardised and you are confident in your ability to fight fires.
- (II) With regard to fires in vehicles, do not attempt to use fire extinguishers while people are still in the vehicle. Once everyone has escaped from the vehicle, only attempt to extinguish a fire while in the early stages. Do not attempt to extinguish a well-developed fire as many vehicle parts will explode when heated.
- (III) Fire blankets (if available) are excellent for helping people with their clothing on fire. Have the person lie on the ground and smother the flames with the fire blanket. When outside the buildings, please ensure that you stand well away from exit doors which may need to be accessed by the Fire Brigade.

7. FIRST AID

A first aid kit should be taken to every survey site and everyone made aware of its location. Site directors should ensure that a trained first-aider is always present on site.

8. HAZARDOUS SUBSTANCES

Sites where hazardous materials are present will usually (but not exclusively) be at what are referred to as *brownfield* sites or land previously used for industrial or commercial purposes. These sites are often redeveloped for use for other purposes and archaeologists can be involved in monitoring and excavating during this process. Many of these sites have their origins in the nineteenth century, when the harmful effects of chemicals and processes were poorly understood, so their use often went unregulated. At many nineteenth and early twentieth century sites, hazardous materials may still be present on-site today in significant quantities. Industrial processes often involve the use of hazardous materials as raw materials, or are produced as a product or by-product of the process itself. These materials are usually hydrocarbons, solvents, pesticides, heavy metals such as lead and asbestos, but almost any substance may be anticipated depending on the process involved. For example, at gasworks (both private and commercial), substances typically found at gasworks sites include;

- hydrocarbons, such as aromatics, polycyclic aromatic hydrocarbons and hydroxy phenyls
- inorganic compounds such as sulphuric acid, sodium hydroxide, cyanides, ammonium
- metals such as arsenic, cadmium, lead, mercury, and
- asbestos (DOE 1995)



Post-excitation view of the retort area of a domestic gasworks. *National Trust*

In another example, early tanneries were renowned for the noxious odours produced and for this reason were often located on the outskirts of towns. The smell was mainly due to large quantities of urine, animal faeces and decaying flesh present on these sites. More modern tanneries used chemicals such as sodium sulphide and sodium hydroxide, as well as salts, acids and various other minerals and chemical compounds, which can remain at harmful levels in the soils at these sites.

Hazardous materials imported to the site

Even where hazardous materials were not originally used at brownfield sites and therefore not suspected, they may still be present for a variety of reasons. One of the main problems is fly-tipping. This is an activity that has been occurring for many years where people do not have easy access to a waste disposal site, or are simply too lazy to take their waste to it. In recent years, this activity has been increasing due to the charges levied by licenced waste disposal sites for the disposal of industrial waste, forcing unscrupulous individuals and companies to simply dump the problem on someone else's land.

During the first and second world wars, uninhabited areas were often selected by the military authorities for training in the use of live ordnance. This training was undertaken by both ground troops and air crews and the types of ordnance employed ranged from small arms to aerial mines. Usually, this ordnance was detonated at the time, but some weapons remain unexploded in the landscape. Further, large amounts of aerial weapons were dropped on Northern Ireland and parts of the Republic of Ireland, by the German air force during the Second World War and stray unexploded bombs may still be present, even outside major target areas such as Belfast.

Since the 1920s, the British Ministry of Defence has dumped an estimated one million tons of munitions in the Irish Sea, mostly in the Beaufort's Dyke, between County Antrim and Scotland. (*The*

Telegraph 13 August 2014). Some of this is dangerously unstable and occasionally washes up on Irish beaches after storms, where it can be found on the ground surface or partially buried.

If unexploded ordnance is encountered at an archaeological site, everyone should be evacuated from the area, bearing in mind there may be no minimum safe distance. The police should immediately be informed and will assume control of the area until it is declared safe.



Live mortar shell. *National Trust*

MANAGING HAZARDOUS SUBSTANCES

1. Research phase

Many of the hazards presenting at archaeological sites can be identified during the initial desk-based site study, before any work has commenced. Information provided by maps, aerial photographs and trade directories can be augmented by discussion with the site owners.

2. Site investigation

A combination of boreholes and trial pits can be undertaken to identify sub-surface ground conditions, with samples collected and analysed. Such investigations may be required for the duration of any archaeological excavations.

3. Monitoring during fieldwork

Many brownfield sites are located in residential areas and continuous monitoring will be required to ensure that contamination from the site does not spread to neighbouring areas. Monitoring should include airborne emissions such as dust and vapour and water-borne emissions in surface or groundwater systems. Asbestos fibre quantification should be undertaken where appropriate.

4. Decontamination procedures

Emergency decontamination is usually undertaken by the fire and rescue service and they should be contacted if anyone has come into contact with hazardous materials. If site personnel have had their clothing contaminated, a pre-planned procedure should be implemented for contaminated clothing to be removed and a supply of emergency clothing, usually in the form of overalls, to be provided. Contaminated clothing should be placed in bags provided for this purpose, labelled and either cleaned, or disposed of by licenced contractors.

5. Post-excavation analysis

The presence of hazardous materials must also be considered at the post-excavation analysis stage, as processing of soil samples and artefacts may release harmful substances.

ASBESTOS

One substance, asbestos, is worthy of particular mention. Asbestos is a naturally-occurring mineral, of which three types were in common use during the twentieth century before its harmful effects were understood. These are Blue asbestos (crocidolite), Brown asbestos (amosite) and White asbestos (chrysolite). Archaeologists will probably encounter white asbestos most frequently, as it has been widely used in the building industry to make roofing tiles, corrugated roofing sheets, gutters, drainpipes and flues. In these types of product, the asbestos fibres are bound into a cement matrix and are relatively harmless if the product is not disturbed.



Examples of asbestos guttering. *Centre for Archaeological Fieldwork*

FIELDWORK

- (a) Landowners may or may not have carried out an asbestos survey of their property, but during the planning stage of **EVERY** fieldwork exercise, survey directors **MUST** ask if such a survey exists. Consideration should be given to the possible presence of asbestos, particularly if any building on the site was in use between c. 1850 and 1980. **If research**

indicates that asbestos is likely to be present, the landowner should be advised that fieldwork will not commence until an asbestos survey has been carried out.

- (b) Even where the presence of asbestos is not suspected during the planning stage, activities such as fly-tipping may have introduced it, so excavation crews should be reminded regularly of this throughout.
- (c) If asbestos is unexpectedly discovered (**no matter how little**) on any part of the site, fieldwork must stop immediately, the site abandoned and the landowner advised to secure the site. This should be recorded in the site notebook.
- (d) All other relevant parties, such as the landowner, should be notified immediately

GENERAL

- (a) If the asbestos has not been disturbed then no further action is required.
- (b) If the asbestos has been disturbed and if clothing and equipment have been contaminated with asbestos, then decontamination procedures will have to be followed before leaving the site. It is essential that contaminated clothing and equipment are not transported elsewhere.

9. LIVESTOCK

FARM ANIMALS

1. At the planning stage of an excavation, it should be established if livestock may be in the area of the excavation. At this stage, it should be made clear to the landowner that survey will not take place unless the animals are removed from the site. Emergency contact details should be obtained for the landowner.
2. When planning for a survey where the presence of livestock might be expected, vehicles should be parked as close as possible, for use as emergency refuges. Routes to nearby gates and safe areas should be noted.
3. If during the survey, livestock are found to be on the site, the survey should immediately be suspended and all members removed from the area. Items of equipment should be removed, if safe to do so, otherwise abandoned. The landowner should be contacted to have the animals removed.
4. At some sites, such as upland pasture, where large areas of land are unfenced, animals may roam freely and might only come into contact with an excavation very occasionally. A constant lookout for livestock should be maintained by survey members. If animals start moving towards a survey (which they may do out of curiosity), action should be taken as detailed in point 3 above.
5. **Under no circumstances** should anyone attempt to 'shoo' animals away or take any measures to remove them. When retreating from the area, staff should remain calm and should not make any sudden or aggressive movements, which might startle animals.

WILD ANIMALS

1. There are few wild animals in Ireland that are large enough to cause harm during archaeological activities. One exception is deer. These are particularly hazardous during the rutting season, between September and November. During this period, male animals compete with mating rights with females and may become aggressive.
2. Deer are normally secretive animals, found in forests and woodland, so where archaeological activities are planned for such areas, the advice of landowners should be sought.

10. LONE WORKING

It is UAS policy that lone working is not to be considered by members under any circumstance. For every fieldwork project, a minimum of two members of staff will be required.

MAINTAINING CONTACT

All groups should have a fully-charged mobile telephone with them at all times and this should be checked regularly to ensure that a good signal is being received.

WORKING IN AREAS OF SECTARIAN TENSION

Generally, fieldwork should not take place at times of heightened sectarian tension and when a sporadic event takes place, then members should immediately withdraw from the area.

SEXUAL HARASSMENT

It is accepted that female lone workers have a higher risk of being sexually harassed and should be aware of this, particularly when working in an all-male environment. Female staff members are encouraged to report any concerns immediately to the survey director.

WORKING IN AREAS OF ROUGH TERRAIN AND CLOSE TO RIVERS AND LAKES

All fieldworkers are particularly at risk of injury in areas of rough terrain, where medical/first aid assistance is not immediately available. Similarly, rivers and lakes are particularly hazardous, particularly after heavy rain.

11. SAFETY AT PUBLIC-ACCESS SITES

Some sites may be made available to members of the public to observe, or to participate in excavation or survey. This presents particular challenges for health and safety management systems.

Survey directors must ensure that public liability insurance cover is in place before any member of the public is permitted access.

VISITORS TO SITES

Where members of the public are invited on to an excavation or survey site, the following guidance should be followed:

1. Participating groups should be visited prior to their arrival on-site and health and safety procedures explained to them.
2. Groups should be accompanied at all times while on site by a member of staff
3. Hazard areas (deep excavations/unstable walls etc.) must be totally enclosed with robust fencing, such as metal fence panels and members of the public must not be permitted at any time to enter these areas.
4. Consideration should be given to marking out safe pathways for people entering and leaving the site.

12. CHILDREN AND VULNERABLE ADULTS

The presence of children and vulnerable adults on site requires additional considerations and these should be in accordance with UAS policy below.

13. MANUAL HANDLING

Manual handling has been identified as presenting a hazard to UAS members. There are three issues to consider when carrying out manual handling:

AVOID IT

Can the lifting operation be avoided altogether? For example, when carrying survey equipment to and from the site. Can this be transported by vehicle instead?

ASSESS THE RISK OF INJURY

If it is necessary to carry out lifting, how likely is it that someone could be injured as a result? Members of the Survey Group should not attempt to lift or carry excessive amounts of equipment.

REDUCE THE RISK

There are a number of ways in which this can be done, such as:

- (i) Remove any obstructions between the object being moved and the final destination

- (ii) Use a firm surface where possible (such as a path)
- (iii) Consider lifting aids, such as a sack trolley, if one is available
- (iv) Remind members of safe lifting techniques
- (v) Take frequent breaks when regular lifting is taking place

14. PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is only to be worn if the relevant hazard cannot be otherwise removed or reduced. UAS survey group members will be issued with high visibility surcoats at every fieldwork event.

HIGH VISIBILITY REFLECTIVE SURCOATS [VIZ VESTS]

High visibility reflective surcoats, or viz-vests, have been designed to give the wearer greater visibility when working in proximity to another member. They are not suitable for working on or near to major roads, where higher visibility clothing is required. It is UAS policy that high-visibility clothing should be worn at all times while on site.

15. RISK ASSESSMENT

Risk assessments will be carried out for every fieldwork activity. This will initially take the form of a dynamic risk assessment, to be carried out by a competent person before any activity takes place. All members of UAS Survey Group present will be made aware of any hazards identified and control measures in place before fieldwork commences. The risk assessment will be revised periodically as the fieldwork takes place. Only minor hazards will be acceptable, provided that adequate control measures can be put in place. In situations where the risk is considered significant, fieldwork will be abandoned. Details will be recorded in the site notebook/diary. All members are encouraged to report any suspected hazards to the survey director.

16. SERVICES

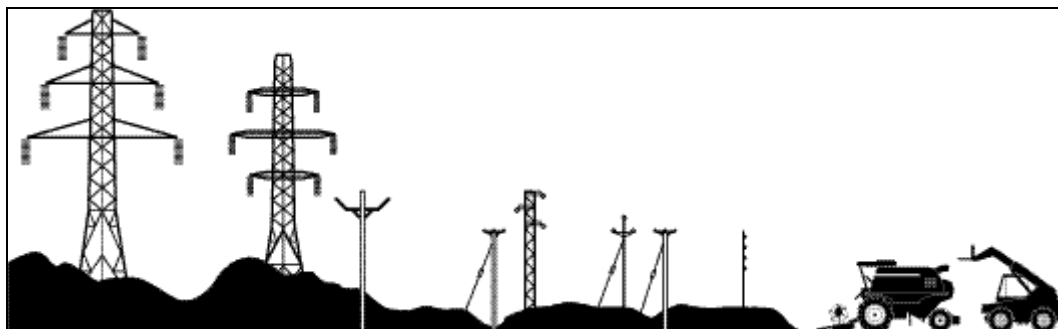
Services, particularly overhead electric cables, are often encountered during archaeological fieldwork and must be treated as extremely hazardous.

ELECTRIC POWER LINES

Extreme care must be taken when working in area where power lines (overhead and underground) are present. Overhead power lines should be immediately obvious, but underground lines may not be marked.

OVERHEAD LINES

Working in areas where overhead power lines are present presents particular problems while surveying with extending staffs. Direct contact need not be made, as electric current can 'arc' between the cable and top of the staff. Care should be taken on sloping ground, as clearances may be reduced as a result.



275 or 400 kV Minimum clearance 7 m 132 kV Minimum clearance 6.7 m 33 kV Minimum clearance 5.2 m 11 kV Low Voltage

Open combine grain tank lids can reach 5.2 m Materials handlers can reach up to 6 m

Accidents can be prevented if operations are **not** carried out within a horizontal distance of at least 9m from power lines on wooden poles or at least 15m from lines on metal towers. These distances should be measured from the line of the nearest conductor to the work, projected vertically downwards to ground level and perpendicular to the route of the line.

- **Never touch an overhead line - even if it has been brought down by machinery, or has fallen.**
- **Never assume lines are dead.**
- **When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground.**
- **Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect the power.**

UNDERGROUND LINES

Underground cables are sometimes located at survey sites. These may not be marked and can sometimes be found at shallow depths. The use of survey pins or flags in these areas should not be considered.

17. SLIPS, TRIPS AND FALLS

Slips, trips and falls have been identified as being the most hazardous feature of survey sites and the environment at such sites does not lend itself to an easy solution. Occasionally, as a survey progresses, increasing numbers people crossing these areas results in gradually worsening conditions.

SLIPS

These can be from muddy or wet conditions underfoot and can be avoided, to some extent, by wearing appropriate footwear with a good tread depth and ensuring these are regularly cleaned. Additional care must be taken when working on slopes, or close to rivers, streams, open trenches or pits.

TRIPS

There are many items at an archaeological site that present trip hazards. These include grid pegs, measuring tapes, string lines and tools and other equipment lying around. To minimise such hazards, unused tools and equipment must be regularly removed from the work area and tape lines and strings that need to be maintained in place for long periods must be marked with high-visibility tape or otherwise fenced off. Care must be taken when using hazard tape in order to prevent the tape itself becoming a hazard. Such areas should be marked at waist height.



Low-level hazard tape presenting a trip hazard

FALLS

Falls from height are considered in further detail below, but a fall into a small pit or trench can result in significant injury.

18. TRAINING

Health, Safety and Welfare training will be provided for all members of the survey group as necessary. Members are encouraged to consider their own personal training needs, in order that training courses can be organised to meet these.

19. WELFARE DURING ARCHAEOLOGICAL FIELDWORK

At all archaeological sites, it is essential to consider the health and well-being of staff and visitors.

PLANNING

The following should be considered at the planning stage:

- The nature of the survey to be carried out and the health risks associated with it.
- The distance members will have to travel to welfare facilities.
- The duration of the project and number of different locations involved.
- The number of members involved.

TOILETS

As most sites surveyed will not have any form of toilet facilities, arrangements will be made to ferry members to and from suitable toilet and hand washing facilities as required.

WEATHER

Survey Group members are advised to bring waterproof clothing, including overtrousers, in showery conditions. Members will not be expected to survey in prolonged or heavy rain. Surveys will not be undertaken in high winds or icy conditions. Surveys will also be abandoned in cases where lightening is a possibility.

20. EQUIPMENT

All survey equipment used by the UAS is subject to regular inspection, with repair or replacement carried out as necessary. Any item of equipment that becomes defective at any other time **MUST** be taken out of use, and clearly labelled '**DEFECTIVE – DO NOT USE**'. Defects are to be reported immediately to the Survey Group Co-ordinator.

21. HEIGHTS/DEPTHS AND CONFINED SPACES

HEIGHTS

Falls from height account for a significant proportion of fatal accidents. UAS members should avoid all such areas as much as possible.



Using step ladder to gain height for photographic purposes. This is extremely hazardous due to uneven/soft ground surfaces and not having hands free to hold on to the steps. **This activity should not be undertaken under any circumstances.** Alternative solutions are available, such as camera mono-poles and drones.

Note: A place 'at height' applies equally at or below ground level if a person could be injured falling from it.

DEPTH

Survey of features such as ditches and very large post-holes will always be subject to hazards such as collapse and this should routinely be considered as part of the site risk assessment. Additional hazards will arise as the depth increases and additional control measures may be required. Such work must be subject to regular review of the risk assessment.

CONFINED SPACES

Confined spaces, such as souterrains, caves and wells are very hazardous areas and specialist assistance should always be sought **prior to entering any such place.**

22. CHILDREN AND VULNERABLE ADULTS

When taking part in public outreach events, UAS personnel may expect to be in close contact with children and vulnerable adults. While normal health, safety and welfare provisions should be adhered to, these groups may require special consideration to ensure their safety and well-being and the following guidance should be considered.

POLICY AIMS

The aim is to:

- provide children and young people with appropriate safety and protection whilst taking part in UAS activities
- allow UAS members to make informed and confident responses to specific child protection issues.

PRIOR TO WORK COMMENCING

- Ensure the safety of all children by careful supervision, proper pre-planning of training or briefing sessions, using safe methods at all times.
- Consider the wellbeing and safety of participants during the planning stage of the event

DURING SURVEY ACTIVITIES

- Administer minor first aid in the presence of others and where required refer more serious incidents to the site first-aider.
- Have access to telephone for immediate contact to emergency services if required.
- Treat all young people equally and ensure they feel valued. Have no favourites.
- Do not allow any rough or dangerous play, bullying, or the use of bad language or inappropriate behaviour.
- Be positive, approachable and offer praise to promote the objectives of the project at all times.

- Do not let any allegations of abuse of any kind to go unchallenged or unrecorded. All accidents are to be recorded in the accident book. Parents should be informed.
- Report accidents or incidents of alleged abuse or poor practice.
- Maintain confidentiality about sensitive information.
- Respect and listen to the opinions of young people.
- Take time to explain archaeological techniques to ensure they are clearly understood.
- Develop an appropriate working relationship with participants, based on mutual trust and respect.
- Be a role model, displaying consistently high standard of behaviour and appearance (disciplined/committed/time keeping), remember children learn by example.
- Refrain from smoking during group activities involving children.
- Never condone rule violations, rough play or the use of prohibited substances
- Do not spend excessive amounts of time alone with children away from others

PUBLICITY

Certain individuals may visit events to take inappropriate photographs or video footage of young people. All members should be vigilant about this possibility. Any concerns during an event should be reported to the person in charge or other responsible person.

You must obtain permission for the filming/photographs to be taken both from the subjects and their parents/carers and record details in the site diary.

Usually, groups participating in organised events will have previously brought any medical issues that might place themselves at risk during fieldwork to the attention of their own staff.

23. VEHICLES

PRIVATE VEHICLES AT UAS SURVEYS

All UAS members wishing to drive to and from sites and particularly if they bring other members with them, should ensure they:

- Have a Full Driving Licence, with no restrictions.
- Be full insured.

All drivers should not drive any vehicle if they feel:

- Physically unwell.
- Fatigued.
- Unsure of their driving competency.

All drivers:

- Should be completely free of the influence of alcohol or any drugs, including prescription medication.
- Should not drive wearing Wellington boots or other heavy boots, or drive using bare feet
- Should be aware of the dangers of driver fatigue. Drivers should ensure that they are well rested before driving. If a driver feels fatigued he or she may ask another eligible driver to drive. If no other eligible driver is available then they must rest until they feel they are able to continue the journey safely.

OFF-ROAD DRIVING

The primary function of vehicles is the transporting of persons and equipment on the public highway. It may on occasion be necessary to use the vehicles off-road to take persons and equipment closer to a survey site. If this is the case then a risk assessment must be carried out. Some 4x4 vehicles have very good off-road driving capabilities. However it would be a mistake to think that they cannot become bogged down or that there are not situations where off-road driving could result in the injury or even death of its driver or passengers. There are a number of basic rules which should be followed before any off-road driving is undertaken:

- All passengers **must** wear seat belts. In difficult ground conditions passengers should leave the vehicle and traverse the ground on foot.

- Do not drive with the fuel level low; driving up an incline could lead to fuel starvation to the engine.
- The route to be traversed must have been first walked by the driver and an assistant. If it is not traversable on foot it is not traversable by vehicle!

BASIC PRINCIPLES OF OFF-ROAD DRIVING

(i) Vehicle handling

The main objective of off-road driving is to keep the vehicle moving in full control of the driver. Correct gear selection is the single most important factor in achieving this. In more difficult conditions, such as slippery, wet or muddy conditions the basic principle is to drive forward as slowly as possible in the highest gear in which it is possible to make the vehicle drive forward, as this reduces the likelihood of loss of traction (an example might be driving at 10mph in third gear on flat muddy ground). In conditions where loss of traction is possible consider the use of the low gears. Care should be taken to avoid sudden or violent braking when driving off-road as this can precipitate a skid. It is better to use the gearing of the vehicle to decelerate.

(ii) Ground Clearance

Although some 4x4 vehicles have a relatively high ground clearance it is possible to become stuck in ruts left by a tractor or for soft mud to impede the vehicles progress even when traction is being maintained. If the ground is so soft that this is a possibility, do not attempt to drive off road.

(iii) Brake checks

It is important to check the brakes after finishing driving off-road in wet conditions as moisture around the braking mechanism can adversely affect braking performance. A simple brake check can be carried out by driving the vehicle for a short distance, applying the footbrake and testing that the brakes are fully effective. In addition, the handbrake should not be relied on to hold the vehicle until the transmission has fully dried. When parked leave the vehicle in gear.

(iv) Unsafe areas

There are a number of types of ground conditions where it is **never** advisable to drive vehicles and these are:

- In bogs, unless on a deliberately constructed road surface across a bog that is suitable for vehicular traffic.
- In areas subject to tidal inundation.

- In areas prone to slippage or subsidence.
- Close to cliff edges or other sharp drops.

(v) What to do if you get stuck:

- Avoid revving the engine and spinning the wheels; this will only get the vehicle more bogged down.
- Clear clogged tyre treads.
- Reverse as far as possible and try to approach the difficult ground at a higher speed.
- Stack brushwood, gravel and small stones beneath the embedded wheel/s to improve traction
- Seek assistance, remembering to use the proper lashing points on a vehicle to pull it free of its obstruction.

Never attempt to use manual force to push a vehicle free of an obstacle or across difficult ground.

There is a significant risk of the vehicle slewing or jerking violently, potentially causing injury.

TRANSPORTING PEOPLE

There should be no more passengers carried than the number of seat belts fitted. Passengers, like any other load, make the vehicle heavier, less manoeuvrable and more difficult to stop. Driving techniques must consequently be modified by driving more slowly, leaving longer stopping distances and cornering at lower speeds and with greater care.

(i) Seatbelt Use:

- All passengers must use seat belts at all times.
- No more than one person may use a seatbelt.

TRANSPORTING EQUIPMENT

Private vehicles must only carry items of survey equipment in accordance with the vehicle manufacturer's instructions. Items of equipment must never be carried in the passenger area.

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