Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Guidance Note:
Fire Safety At Non-Hazardous Waste Transfer Stations

Acknowledgements
The photo on the next page is courtesy of Navan Fire Brigade, Meath County Fire & Rescue Service and the photo in Figure 3.1 is courtesy of Designer Group.

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Guidance Note:
Fire Safety at Non-Hazardous Waste Transfer Stations

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(Photo: courtesy of Navan Fire Brigade, Meath County Fire & Rescue Service)

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Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Environmental Protection Agency

The Environmental Protection Agency (EPA) is a statutory body responsible for protecting the environment in Ireland. We regulate and police activities that might otherwise cause pollution. We ensure there is solid information on environmental trends so that necessary actions are taken. Our priorities are protecting the Irish environment and ensuring that development is sustainable.

The EPA is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Environment, Heritage and Local Government.

OUR RESPONSIBILITIES

LICENSING

We license the following to ensure that their emissions do not endanger human health or harm the environment:

- waste facilities (e.g., landfills, incinerators, waste transfer stations);
- large scale industrial activities (e.g., pharmaceutical manufacturing, cement manufacturing, power plants);
- intensive agriculture;
- the contained use and controlled release of Genetically Modified Organisms (GMOs);
- large petrol storage facilities.
- waste water discharges

NATIONAL ENVIRONMENTAL ENFORCEMENT

- Conducting over 2,000 audits and inspections of EPA licensed facilities every year.
- Overseeing local authorities' environmental protection responsibilities in the areas of - air, noise, waste, waste-water and water quality.
- Working with local authorities and the Gardaí to stamp out illegal waste activity by co-ordinating a national enforcement network, targeting offenders, conducting investigations and overseeing remediation.
- Prosecuting those who flout environmental law and damage the environment as a result of their actions.

MONITORING, ANALYSING AND REPORTING ON THE ENVIRONMENT

- Monitoring air quality and the quality of rivers, lakes, tidal waters and ground waters; measuring water levels and river flows.
- Independent reporting to inform decision making by national and local government.

REGULATING IRELAND'S GREENHOUSE GAS EMISSIONS

- Quantifying Ireland's emissions of greenhouse gases in the context of our Kyoto commitments.
- Implementing the Emissions Trading Directive, involving over 100 companies who are major generators of carbon dioxide in Ireland.

ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Co-ordinating research on environmental issues (including air and water quality, climate change, biodiversity, environmental technologies).

STRATEGIC ENVIRONMENTAL ASSESSMENT

- Assessing the impact of plans and programmes on the Irish environment (such as waste management and development plans).

ENVIRONMENTAL PLANNING, EDUCATION AND GUIDANCE

- Providing guidance to the public and to industry on various environmental topics (including licence applications, waste prevention and environmental regulations).
- Generating greater environmental awareness (through environmental television programmes and primary and secondary schools' resource packs).

PROACTIVE WASTE MANAGEMENT

- Promoting waste prevention and minimisation projects through the co-ordination of the National Waste Prevention Programme, including input into the implementation of Producer Responsibility Initiatives.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

MANAGEMENT AND STRUCTURE OF THE EPA

The organisation is managed by a full time Board, consisting of a Director General and four Directors.

The work of the EPA is carried out across four offices:

- Office of Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental Assessment
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet several times a year to discuss issues of concern and offer advice to the Board.

An Ghníomhaireacht um Chaomhnú Comhshaoil

Is í an Gníomhaireacht um Chaomhnú Comhshaoil (EPA) comhlachta reachtúil a chosnaíonn an comhshaol do mhuintir na tíre go léir. Rialaímid agus déanaimid maoirsiú ar ghníomhaíochtaí a d'fhéadfadh truailliú a chruthú murach sin. Cinntímid go bhfuil eolas cruinn ann ar threochtaí comhshaoil ionas go nglactar aon chéim is gá. Is iad na príomh-nithe a bhfuilimid gníomhach leo ná comhshaol na hÉireann a chosaint agus cinntiú go bhfuil forbairt inbhuanaithe.

Is comhlacht poiblí neamhspleách í an Ghníomhaireacht um Chaomhnú Comhshaoil (EPA) a bunaíodh i mí Iúil 1993 faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil 1992. Ó thaobh an Rialtais, is í an Roinn Comhshaoil, Pobal agus Rialtais Áitiúil.

ÁR bhFREAGRACHTAÍ

CEADÚNÚ

Bíonn ceadúnais á n-eisiúint againn i gcomhair na nithe seo a leanas chun a chinntiú nach mbíonn astuithe uathu ag cur sláinte an phobail ná an comhshaol i mbaol:

- áiseanna dramhaíola (m.sh., líonadh talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh., déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- diantalmhaíocht;
- úsáid faoi shrian agus scaoileadh smachtaithe Orgánach Géinathraithe (GMO);
- mór-áiseanna stórais peitreail.
- scardadh dramhuisce
- dumpáil mara

FEIDHMIÚ COMHSHAOIL NÁISIÚNTA

- Stiúradh os cionn 2,000 iniúchadh agus cigireacht de áiseanna a fuair ceadúnas ón nGníomhaireacht gach bliain.
- Maoirsiú freagrachtaí cosanta comhshaoil údarás áitiúla thar sé earnáil - aer, fuaim, dramhaíl, dramhuisce agus caighdeán uisce.
- Obair le húdaráis áitiúla agus leis na Gardaí chun stop a chur le gníomhaíocht mhídhleathach dramhaíola trí comhordú a dhéanamh ar líonra forfheidhmithe náisiúnta, díriú isteach ar chiontóirí, stiúradh fiosrúcháin agus maoirsiú leigheas na bhfadhbanna.
- An dlí a chur orthu siúd a bhriseann dlí comhshaoil agus a dhéanann dochar.
- don chomhshaol mar thoradh ar a ngníomhaíochtaí.

MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOL

- Monatóireacht ar chaighdeán aeir agus caighdeáin aibhneacha, locha, uiscí taoide agus uiscí talaimh; leibhéil agus sruth aibhneacha a thomhas.
- Tuairisciú neamhspleách chun cabhrú le rialtais náisiúnta agus áitiúla cinntí a dhéanamh.

RIALÚ ASTUITHE GÁIS CEAPTHA TEASA NA HÉIREANN

- Cainníochtú astuithe gáis ceaptha teasa na hÉireann i gcomhthéacs ár dtiomantas Kyoto.
- Cur i bhfeidhm na Treorach um Thrádáil Astuithe, a bhfuil baint aige le hos cionn 100 cuideachta atá ina mór-ghineadóirí dé-ocsaíd charbóin in Éirinn.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde ar shaincheisteanna comhshaoil a chomhordú (cosúil le caighdéan aeir agus uisce, athrú aeráide, bithéagsúlacht, teicneolaíochtaí comhshaoil).

MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Ag déanamh measúnú ar thionchar phleananna agus chláracha ar chomhshaol na hÉireann (cosúil le pleananna bainistíochta dramhaíola agus forbartha).

PLEANÁIL, OIDEACHAS AGUS TREOIR CHOMHSHAOIL

- Treoir a thabhairt don phobal agus do thionscal ar cheisteanna comhshaoil éagsúla (m.sh., iarratais ar cheadúnais, seachaint dramhaíola agus rialacháin chomhshaoil).
- Eolas níos fearr ar an gcomhshaol a scaipeadh (trí cláracha teilifíse comhshaoil agus pacáistí acmhainne do bhunscoileanna agus do mheánscoileanna).

BAINISTÍOCHT DRAMHAÍOLA FHORGHNÍOMHACH

- Cur chun cinn seachaint agus laghdú dramhaíola trí chomhordú An Chláir Náisiúnta um Chosc Dramhaíola, lena n-áirítear cur i bhfeidhm na dTionscnamh Freagrachta Táirgeoirí.
- Cur i bhfeidhm Rialachán ar nós na treoracha maidir le Trealamh Leictreach agus Leictreonach Caite agus le Srianadh Substaintí Guaiseacha agus substaintí a dhéanann ídiú ar an gcrios ózóin.
- Plean Náisiúnta Bainistíochta um Dramhaíl Ghuaiseach a fhorbairt chun dramhaíl ghuaiseach a sheachaint agus a bhainistiú.

STRUCHTÚR NA GNÍOMHAIREACHTA

Bunaíodh an Ghníomhaireacht i 1993 chun comhshaol na hÉireann a chosaint. Tá an eagraíocht á bhainistiú ag Bord lánaimseartha, ar a bhfuil Príomhstiúrthóir agus ceithre Stiúrthóir.

Tá obair na Gníomhaireachta ar siúl trí ceithre Oifig:

- An Oifig Aeráide, Ceadúnaithe, Taighde agus Úsáide Acmhainní
- An Oifig um Fhorfheidhmiúchán Comhshaoil
- An Oifig um Measúnacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáide

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag ball air agus tagann siad le chéile cúpla uair in aghaidh na bliana le plé a dhéanamh ar cheisteanna ar ábhar imní iad agus le comhairle a thabhairt don Bhord.

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1. INTRODUCTION

This document is intended to provide guidance on fire safety at non-hazardous waste transfer stations (WTS). The term WTS is used in this document as a generic term to describe waste facilities that accept, store and process waste prior to onward transport to disposal or further recovery facilities.

WTS vary in size, type of waste stored, location, facilities and design. It is not possible to provide comprehensive guidance capable of covering every possible risk, and every site needs a site-specific fire risk assessment undertaken by a suitably qualified person.

Typical waste types accepted at non-hazardous WTS include household, commercial, industrial, construction and demolition (C&D) waste. These waste streams contain a wide variety of waste including plastic, paper, cardboard, textiles, rubber, timber, food and garden waste, plasterboard, metals, etc. Waste may be stored both inside and outside WTS buildings. There is also an increasing tendency to store very large amounts of waste at a site prior to onward transfer (see Figures 1.1 and 1.2).

The nature and quantities of the materials being stored mean that fires at WTS have the potential to be very serious events, posing risk to life and presenting hazards to the local community and the environment. In recent years, some serious fires have taken place in WTS in Ireland, demonstrating that fire-safety management in some WTS is an issue. These fires were costly to the operators, in terms of business disruption, capital losses (buildings and plant) and consequent insurance premium increases. The growing incidence of fires has prompted the development of this guidance note.

Fires involving combustible materials can cause significant harm to people and the environment, e.g:

- combustion products, even those from non-toxic materials, release airborne pollutants, which can cause both short- and long-term effects on human health and the environment;
- firewater run-off can transport pollutants into drainage systems, rivers and lakes, groundwater and soil, threatening water supplies, public health, wildlife and recreational use;
- thermal radiation harms people and the environment and can lead to fire spread;
- hazardous waste will be created by the fire and the impacts of fire fighting;
- explosions and projectiles can harm people and spread the fire to unaffected areas;
- fire can threaten life and cause property damage (Environment Agency, 2013).

It is the responsibility of each WTS operator to ensure that they comply with all relevant legislation in relation to fire safety. Nothing in this guidance should be construed as negating the operator's statutory obligations or requirements under any other enactments or regulations.

Figure 1.1 Baled waste stored externally

Figure 1.2 Large stockpiles of waste stored internally

Relevant legislation in relation to fire safety includes the following:

- Building Control Act 2007 and associated Regulations;
- Building Regulations 1997–2013;
- Fire Services Acts 1981 and 2003;
- Safety, Health and Welfare at Work Act 2005 and associated Regulations.

The References & Technical Guidance section of this guidance provides further sources of information. The competent authorities in Ireland for the above legislation are the Health and Safety Authority and the Local Authorities, who should be consulted in the event of any queries.

2. FIRE PREVENTION

For a fire to start it is necessary to have fuel, a source of ignition (heat) and oxygen. The relationship between these elements is often referred to as the 'fire triangle' (see Figure 2.1). If any one of the components of the fire triangle is missing, a fire cannot start. Taking measures to avoid the three coming together will reduce the chances of a fire occurring.

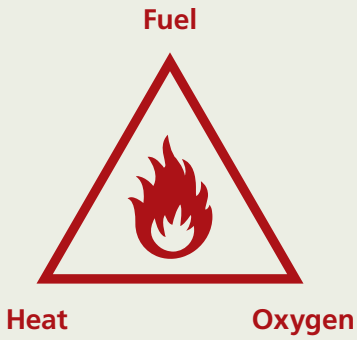

Figure 2.1 The Fire Triangle

Sources of Ignition (Heat) in WTS

There are many sources of ignition potentially available in WTS. These may include the following:

- smoking;
- vehicle exhausts;
- hot processes/hot work, e.g. welding or shrink wrapping;
- extract fans for dust and fume removal systems, e.g. by build-up of debris;
- frictional generated heat from mechanical equipment;
- poorly installed and/or maintained mechanical equipment, such as bearings, that can overheat
- static charge from mechanical equipment, e.g. conveyor belts;
- poor electrical installations, e.g. overloads, heating from bunched cables, damaged cable;
- faulty or misused electrical equipment, e.g. fork lift truck charging units;
- light fittings and lighting equipment, e.g. halogen lamps or display lighting or overhead lights too close to stored waste;
- hot surfaces and obstruction of equipment ventilation;
- spontaneous ignition and self-heating of stockpiles;
- batteries and accumulators;
- 'tramp' metal that finds its way into moving machinery and causes localised 'hot spots';
- some materials, such as rubber crumb, have been reported to have ignited spontaneously (see Spontaneous heating of piled tyre shred and rubber crumb – Briefing note at http://www.hse.gov.uk/rubber/spontaneous.htm. Paper and other cellulose-based materials have reportedly been known to self-heat, and have even ignited where stocks are so large that the heat cannot radiate safely.
- malicious ignition (arson/vandalism).

Sources of Fuel

- All stored waste materials other than metals, glass or non-combustible building waste.
- Plastic and timber storage aids both in use and idle, such as pallets and waste bins.
- Flammable liquids and liquid-based products, such as paints, varnishes, solvents and adhesives.
- LPG containers, fuel containers, aerosols.

Sources of Oxygen

- Naturally occurring in the atmosphere.
- Additional sources of oxygen can sometimes be found in materials used or stored at premises, such as oxygen cylinders used in welding processes.

Fire Prevention Measures

Preventative measures such as the following, should be put in place to control sources of fire:

- control sources of ignition such as heating pipes, naked flames, light bulbs, space heaters, furnaces/incinerators;
  - keep potential ignition sources at least 6 metres away from stacks of combustible and flammable materials
  - reinforce the message using signs
- ensure staff and any contractors follow safe working practice when undertaking hot working, such as welding and cutting;
- ensure all visitors are aware of the correct safety and fire prevention procedures to follow while on site;
- apply a no-smoking policy or ensure designated smoking areas are situated away from combustible materials;
- introduce a regular maintenance and inspection programme for all site areas including site machinery and ensure good housekeeping, e.g. keeping levels of dust, fibre and paper in buildings and around the site to a minimum;
- put site security measures in place; such as security fencing, intruder alarms and CCTV, to prevent arson. Arrangements should cover both the working day and outside normal hours;
- have all site vehicles fitted with fire extinguishers and dust filters;
- have all bucket loaders fitted with rubber strips to prevent sparks being generated when the bucket comes into contact with hard-standing etc.;
- consider implementing a fire-watch at the end of the shift (when dust from processing operations can settle onto hot exhausts/engine parts), and also for separation distances to be observed between plant and material when the site is not staffed;
- consider the provision of an 'emergency/quarantine area'. This must be kept available at all times for use if a hot load is imported, or if a hot-spot is identified in a stockpile, and turning or digging out to isolate are considered suitable measures. Such an area would require suitable separation distances to be maintained around it when in use, and must not obstruct exit routes etc., as it would be very high risk;
- put measures in place to reduce risk of self-combustion;
- manage size and spacing of stockpiles/stacks;
- consider enclosing stockpiles/stacks;
- consider whether to turn or not turn stockpiles/stacks.

The Environment Agency Reducing Fire Risk at Sites Storing Combustible Materials: Technical Guidance Note (TGN7.01) (2013) provides further detail on the above preventative measures including recommended maximum stockpile/stack sizes and minimum separation distances.

3. FIRE DETECTION & WARNING SYSTEMS

WTS should be provided with an appropriate fire detection and alarm system. The more quickly a fire is detected and fought, the better.

A checklist will aid the choice of detection system to be used:

- The means of detection must ensure a fire is discovered quickly enough for the alarm to be raised in time for all the occupants to escape to a place of safety.
- The alarm must be clearly heard and understood by everyone throughout the whole building.
- If the fire-detection and warning system is electrically powered, it must have a back-up power supply.
- Such equipment and facilities must be adequately maintained and regularly tested.

In some very small WTS a simple system of manually operated sounders may be acceptable (e.g. hand-operated bell). If a manual alarm system has been installed:

- The alarm should be audible throughout the building when any one manual fire alarm is operated;
- Each manual fire alarm should be sited in a safe area near an exit;
- The mechanism of any manual fire alarm should be reliable.

In more complex premises, particularly those with raised picking floors or sub-divisions where an alarm given from any single point is unlikely to be heard throughout the building (see Figure 3.1), an electrical system incorporating sounders and manually operated call points (break-glass units, see Figure 3.2) is likely to be required.

Figure 3.1 Complex WTS processing area (Photo: courtesy of Designer Group)

Figure 3.2 Break-glass unit

This type of system is usually acceptable where all parts of the building are occupied at the same time and it is unlikely that a fire could start without somebody noticing it quickly. However, where there are unoccupied areas or sub-divisions within the space that can inhibit early discovery of a fire, automatic fire detection may be necessary.

It may also be necessary to consider special arrangements for times when people are working alone, are disabled, or when the normal occupancy patterns are different, e.g. when maintenance staff or other contractors are working at the weekend.

Good practice for early detection of fire includes:

- regular visual checks of known fire risk areas by security or other designated persons;
- remote monitoring of key areas by CCTV (ideally in colour in order to observe the smoke more readily), including external areas where large stockpiles of materials may be at risk of arson;
- probe monitoring of the internal temperature of stockpiles of decomposing waste;
- heat or flame detection;
- strobe lights in noisy areas.

Where a detection system is required as part of the system the choice of detection unit will usually be determined by the system designer/installer. In most areas of WTS, smoke detectors are the simplest and most cost-effective choice (see Figure 3.3). Dustier areas may require combination detector heads (to avoid false alarms due to contamination). Heat detectors may be appropriate in some parts of a building, where contamination potential is very high.

Figure 3.3 Smoke detector

Where a fire detection and alarm system is provided, the system should comply with the recommendations relevant to design and installation contained in Irish Standard I.S. 3218: 2009 Fire Detection and Fire Alarm Systems for Buildings – System Design, Installation, Servicing and Maintenance.

4. FIRE CONTROL & FIRE FIGHTING FACILITIES

Compartmentation

The internal subdivision of a building into fire compartments limits the potential for fire to spread within the building as well as protecting the escape arrangements. In an uncompartmented building all the occupants and contents of the building have to be considered at risk in the event of fire.

In open-plan WTS buildings the area is undivided by partitions, although there may be some screens or other visual blockages; for example, part-height walls in tipping areas to separate waste into categories. In this instance many of the occupants may be aware of smoke from a fire at the outset and this will give the advantage of early warning. Nevertheless, the rapid spread of fire and smoke by some materials in the early stages of a fire can produce very hazardous conditions.

Upper gallery walkways and offices expose workers and staff to smoke and heat at the very early stages of fire development, so early detection would be essential.

A compartment may consist of a single- or multi-storey room within a building, or the entire building. More information on compartment size and hazard rating may be found in Technical Guidance Document B: 2006 (TGD-B).

Fire Suppression

Fire control (suppression) systems vary from simple, portable hand-held extinguishers to fixed fire-fighting equipment such as hose reels, sprinklers or foam systems. Portable fire-fighting equipment can reduce the risk of a small fire developing into a large one.

This equipment will need to comprise enough portable extinguishers, designed to European Standard EN 3 series, suitable for the risk and will need to be properly maintained (unlike the example shown in Figure 4.1).

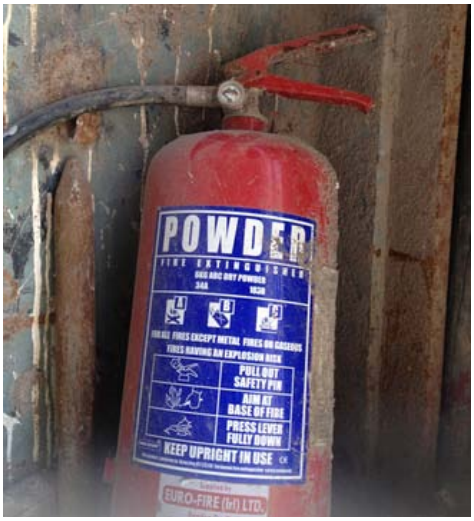

Figure 4.1 Poorly maintained fire extinguisher

The number and siting of portable extinguishing equipment are determined by reference to I.S. 291:
The Use, Siting, Inspection and Maintenance of Portable Fire Extinguishers. It is necessary to indicate the location of extinguishers by suitable signage.

Hose-reels conforming to I.S. EN 671-1 are required in WTS having a floor area exceeding 500m^2 for use by trained staff or firefighters.

All staff should be familiar with the location and basic operating procedures for the equipment provided, in case they need to use it.

Other fixed installations and facilities to assist firefighters, such as dry rising mains and access for fire appliances, or automatically operated, fixed fire suppression systems such as sprinklers and gas or foam monitors or flooding systems, may also have been provided.

Sprinkler systems should be designed, installed and commissioned in accordance with IS EN 12845 for new systems or BS 5306: Part 2 for systems installed before 2004.

Such equipment and facilities must be adequately maintained and regularly tested.

For effective fire-fighting operations, fire brigade appliances should be able to get within easy reach of a building.

Sources of Water for Fire-fighting

Water for fire-fighting is available by way of a number of possible sources as follows:

- Water carried on fire appliances (water tenders, water tankers, etc.);
- Hydrants on external fire mains;
- Static storage tanks or reservoirs;
- Other sources such as rivers, canals, ponds, etc., where adequate access for pumping is available.

Fire mains are pipes installed in and around a building and equipped so that the fire service may connect hoses to hydrants to receive a supply of water to fight fires. The supply for these mains would normally be via the public water supply.
In areas without adequate public mains, a bulk or static supply would be required. If this takes the form of a static tank (see Figure 4.2), its capacity may be determined by reference to BS5588: Part 5. A system of pumps will also be required to create the necessary water flows and pressure.

Firewater retention ponds are likely to become contaminated during a fire. Consequently their use as a source of fire-fighting water for further application onto the fire is generally not recommended. This option may, however, be examined on a case-by-case basis.

Figure 4.2 Static fire-fighting water supply tank

5. FIRE ESCAPE, SIGNAGE & LIGHTING

Means of Escape

Waste operators must ensure that the escape routes are:

- suitable;
- easily, safely and immediately usable at all times;
- adequate for the number of people likely to use them;
- generally usable without passing through doors requiring a key or code to unlock, or with low-level manual over-rides for metal roller shutter doors;
- free from any obstructions, slip or trip hazards (see Figure 5.1);
- well lit by normal or emergency escape lighting;
- available for access by the emergency services.

Figure 5.1 Fire exit free of obstruction

Fire Exit Free of Obstruction

In multi-occupied premises, escape routes should normally be independent of other occupiers, i.e. people should not have to go through another occupier's premises as the route may be secured or obstructed. Where this is not possible, then robust legal agreements should be in place to ensure their availability at all times.

When changing the design or use of an area it will be necessary to check that the existing means of escape are still adequate.

In the early stages of a fire, the most important effects will usually be those of smoke and other products of combustion. Often smoke will be the first evidence of fire detectable by the occupants and is thus likely to be the first cause of alarm.

To facilitate escape it is necessary:

- to ensure that protected escape routes are safeguarded against the ingress of smoke;
- to regulate the distance people have to travel before they reach a storey exit or final exit.

Full guidance on the design and requirements for means of escape may be found in TGD-B.

Exit Signage & Wayfinding

In simple WTS a few signs installed in accordance with the Safety, Health and Welfare at Work (General Application) Regulations (S.I. No. 299 of 2007) indicating the location of the fire exit doors may be all that is needed. In more complex premises, a series of signs directing people along the escape routes towards the final exit will be needed.
Escape and wayfinding signage should:

- provide clear, unambiguous information to enable people to leave a building safely in an emergency.
- It should incorporate, or be accompanied by, a directional arrow.
- If the escape route to the nearest exit is not obvious then it should be indicated by additional intermediate (wayfinding) signs.
- Signs should be positioned so that a person escaping will always have the next escape route sign in sight.
- Signs should be sited at the same height throughout the escape route, so far as is reasonably practicable.
- Signs should be pictographic (see Figure 5.2).
- Signs should be illuminated when in operation to ensure they are conspicuous and legible.

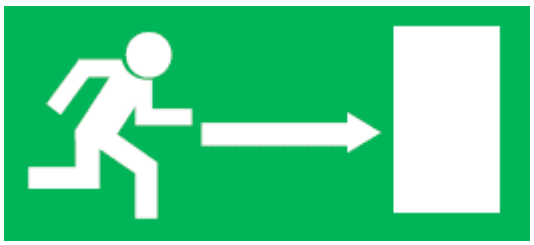

Figure 5.2 Exit Pictogram

There are a number of options available to achieve this illumination, such as external or internal illumination of the sign. The supplier or other competent person can provide further advice.

It is possible to use photo-luminescent signs for wayfinding purposes to supplement exit signage. This type of sign needs a period of exposure to light before it becomes visible in darkness (but gets fainter with time). They are not a substitute for appropriate emergency lighting and should only be used where other forms of illumination are present. Guidance about the use of photo-luminescent fire safety signs and notices can be found in BS 5266: Part 6.

Emergency Lighting

The primary purpose of emergency escape lighting is to illuminate escape routes and key safety equipment, and any system should be designed and installed in accordance with IS EN 3217. The size of the WTS will determine the complexity of the emergency escape lighting required. In simple single-storey premises, single 'stand-alone' escape lighting units may be sufficient and these can sometimes be combined with exit or directional signs.

In larger WTS an efficient and cost-effective method of illuminating escape routes in an emergency is by using spotlights. These are normally self-contained units consisting of a battery, switching mechanism and spotlights fitted to operate automatically on a circuit or mains failure.

These self-contained units can be suspended from roofs, structural steelwork such as columns or beams, or substantial fixed high racking, or attached to walls etc. and are capable of illuminating escape routes easily. They should be located at high level and point downwards (see Figure 5.3).

Figure 5.3 Emergency lighting

An emergency escape lighting system should normally cover the following:

- each exit door;
- escape routes, including outside on each final exit and external escape routes;
- emergency exit and wayfinding signage, fire-fighting equipment and fire alarm call points;
- windowless rooms and toilet accommodation exceeding 8m^2, areas in premises greater than 60m^2;
- equipment that would need to be shut down in an emergency.

It is not necessary to provide individual lights (luminaires) for each item above, but there should be a sufficient overall level of light to allow them to be visible and usable.

Emergency escape lighting can be either 'maintained', i.e. on all the time, or 'non-maintained' which only operates when the normal lighting fails. Systems or individual lighting units (luminaires) are designed to operate for durations of between one and three hours. In practice, the three-hour design is the most popular and can help with maintaining limited continued use of WTS during power failure (other than in an emergency situation).

6. FIRE RESPONSE PLANNING & STAFF TRAINING

Fire Response Plan

Each waste operator should have a Fire Response Plan in place that should include the following elements:

- A description of the:
  - communication arrangements, e.g. named contacts, key-holders with their telephone numbers;
  - types, quantities and properties of combustible and other hazardous materials on the site;
  - the number of people working on site (staff and contractors), including any differences between weekdays/ weekends and times of the day;
  - the number and types of heavy plant and machinery and operators on site to assist with initial fire breaks;
  - likely burn times of the material;
  - procedures for the disposal of firewater and any other waste arising during a fire.
- A site plan showing:
  - layout of buildings;
  - hazardous areas on site (location of gas cylinders, process areas, chemicals, stacks of combustible materials, oil and fuel tanks, etc.);
  - main access routes for fire engines and any alternative accesses if available;
  - access points around the site perimeter to assist fire fighting;
  - hydrants and water supplies;
  - any watercourse, borehole, or well located within or near the site;
  - areas of natural and unmade ground;
  - the location of plant and pollution prevention equipment and materials;
  - drainage systems, including foul and surface water drains, and their direction of flow;
  - the location of drain covers and any pollution control features such as firewater containment systems.
- The procedures staff should follow if a fire starts. This should cover the period before and after the fire services arrive and arrangements during and outside normal working hours (Environment Agency, 2013).

It is advisable to consult with the relevant fire services when preparing the plan.

Staff Fire Safety Training & Awareness

All fire safety training should be given by a competent person.

All staff, including part-time staff, cleaners and contractors should be trained and instructed in the following matters:

- the action to be taken upon discovering a fire;
- raising the alarm, including the location of alarm indicator panels;
- how they will be warned if there is a fire and the action to be taken upon hearing the fire alarm;
- how the fire and rescue service and any other necessary services will be called and who will be responsible for doing this;
- the location of firefighting equipment;
- knowledge of the escape routes, especially those not in regular use;
- appreciation of the importance of fire doors and of the need to close all doors at the time of a fire and on hearing the fire alarm;
- stopping machines and processes and isolating power supplies, where appropriate;
- how the evacuation of the premises should take place;
- where people should assemble after they have left the premises and procedures for checking whether the premises have been evacuated;
- arrangements for fighting the fire;
- the duties and identity of staff who have specific responsibilities if there is a fire;

- any machines/processes/appliances/power supplies that need to be stopped or isolated if there is a fire;
- specific arrangements, if necessary, for high fire-risk areas;
- contingency plans for when life safety systems, such as fire detection and alarm systems, sprinklers or smoke control systems, are out of order;
- procedures for meeting the fire and rescue service on their arrival and notifying them of any special risks, e.g. the location of highly flammable materials.

Induction training for new staff should be given on the first day of their appointment and should include instruction on what to do if fire is discovered, what to do when hearing the fire alarm, and should also involve a walk over the various escape routes.

Additional training or the use of an interpreter may be required if an employee's language is not English. The trainer must be assured that the employee has fully understood all of the training given. Where required, hand-outs, leaflets and instructions should be in the appropriate language for the employee.

Thereafter staff should receive sufficient training at regular intervals (at least once a year) to make sure that they remain familiar with the fire precautions for the workplace and are reminded of the action to be taken in an emergency. Training will need to be more frequent where there is a high turnover of staff or where there is a high risk of fire.

All activities of outside contractors should be strictly supervised and controlled, and management should ensure that all necessary precautions against fire are taken.

Particular attention should be paid to the fire safety training and education of those carrying out welding or cutting, using blow lamps or other open flames, and other types of hot work, whether employees or contractors.

Details of the training given/received should be recorded in the fire safety manual or in a log book.

Staff with specific responsibilities in the event of fire should receive additional instruction and training appropriate to their role. In larger premises it may be appropriate to train specific staff on the use of firefighting equipment provided.

Staff with specific duties in the event of fire (e.g. engineering staff and maintenance staff, receptionists and telephonists) should receive detailed instruction in their own duties. Such staff should receive appropriate refresher training at least once, and preferably twice, in each 12 month period.

In addition all staff having a supervisory role in the event of fire (e.g. departmental heads, fire marshals or wardens, and in some large workplaces, firefighting teams) should receive additional training.

Such training could include procedures for the following:

- checking that the staff are safely evacuated and that everyone is accounted for;
- liaising with the fire brigade on arrival and confirming whether everyone has been accounted for and the location of the fire, and provision of maps of the facility showing location of different waste types, hazardous substances, hydrants, etc.
- where necessary, making arrangements for the fire brigade vehicles to enter the site

Outside contractors should be given at least the minimum instruction as recommended for new employees. They should also be trained in the fire safety precautions relating to their special tasks. If they do not have such training, they should be allowed to work only with supervision or after suitable training has been given.

Points to be included are:

- the procedure for obtaining a hot work permit;
- preparation of the place of work;
- care and attention during work;
- leaving the work place clean and safe;
- the need for a check after the job is completed and for a final check at a later time;
- training in the operation of available fire extinguishers;
- particular precautions needed where there are special risks in the premises.

The training needs should be based on the written instructions appropriate to their specific responsibilities. Details of all training and instruction given/received should be recorded in the fire safety manual or in a log book.

The following are examples of matters that should be recorded in the safety manual or the log book:

- date of the instruction or exercise;
- duration;
- the name of the person giving the instruction;
- names of the persons receiving the instruction;
- the nature of the instruction, training or drill.

Fire Routine

A fire routine should be devised, taking into account the uses to which the premises are put and, in particular, the means of giving warning and the means of communication.

All staff should be familiar with the fire routine.

'Fire instruction' notices stating, in concise terms, the essentials of the action to be taken upon discovering a fire and on hearing the fire alarm should be exhibited at conspicuous positions in all parts of the building.

Key members of staff should have specific roles relevant to the fire routine.

The fire authority or a specialist fire safety consultant should have been consulted regarding the fire routine.

7. POST-FIRE ACTIONS

Fire & Accident Investigation

If injury or death has occurred, or there is any suspicion that the fire may have been started maliciously, then the fire brigade will secure and preserve the site for investigation by the Garda Technical Bureau.

Key personnel and witnesses will be interviewed by the Gardaí.

This might include critical messages recorded at the security gate, or CCTV footage obtained from security videos from on-site equipment, which can often be of value in subsequent investigations. Action on this matter needs to be taken without delay, as some recording systems will re-use the tapes.

Any notifiable incident must be reported to the Health and Safety Authority by the relevant employer. Key personnel will be interviewed by the Health and Safety Authority.

Following release of the site by the Garda investigation team the site must be kept secure until the waste operator's insurers or nominated loss-adjuster examine the site.

Safety Issues

The Incident Fire Commander will control the site until he is satisfied that the fire has been fully extinguished and there is no risk of further fire development. This may take more than a day to achieve for a major fire.

Following release of the site by Gardaí and the fire brigade the waste operator must take all necessary measures to ensure that his building is safe to enter before he or his staff may access any part of the site. This advice may be given by a suitably qualified insurance assessor or engineer employed by the waste operator or insurance company.

In the event that the building is salvageable and safe, the waste operator will need to employ a specialist clean-up company to reinstate, as far as is practicable, the buildings and machinery involved. The specialist salvage company will need to have the appropriate expertise for dealing with the toxic products resulting from the fire.

Clean-Up of Fire-Damaged Waste

All fire-damaged waste (see Figure 7.1) will need to be characterised in order to determine suitable facilities for the recovery or disposal of the waste. Depending on the type of waste that was burnt and how badly damaged the waste is, characterisation may include the following:

- compositional analysis of the waste material;
- waste acceptance criteria testing for landfill;
- waste characterisation by visual sorting.

Figure 7.1 Fire Damaged Waste

Fire Water

The EPA Guidance Note to Industry on the Requirements for Fire-Water Retention Facilities (1995) gives guidance to operators of industrial activities on the requirements for, design of and types of firewater retention facilities. The need for firewater retention at a waste facility will depend on the results of an assessment of the risk of environmental pollution associated with contaminated firewater. This assessment may take place during the licensing stage or may be a requirement of the licence itself.

Contaminated firewater collected on-site must be characterised to determine the options for proper disposal. The waste operator must agree the outlet for disposal with the EPA. The operator should have preliminary agreements in place with final disposal facilities prior to approval of the risk management programme.

Review of Fire Risk Assessment & Fire Response Plan

After a fire has taken place, it is important that all procedures and plans are reviewed, and amended where necessary, in order to improve fire preventative measures and fire response measures.

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