

Electric power and distribution health and safety toolkit



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Foreword

Electricity is central to many aspects of our daily lives and demand is increasing. New end users continue to be connected to electricity networks around the world. It is becoming more common for us to charge our electric vehicles before commuting to work or use heat pumps to heat our homes, but we should not be complacent about the dangers associated with the energy we use every day. Usually, whether at home or at work, if we perceive a dangerous situation or a risk of harm, our senses automatically take over and we react. The problem with electricity is that we cannot see, taste, smell or hear it, so we are not aware of the risk until it is too late. This is why electricity is often termed the silent killer. It is also well established that contact with electricity will result in serious or fatal injury.

The European Bank for Reconstruction and Development (EBRD) and the Dutch Entrepreneurial Development Bank (FMO) recognise the challenges to which electrical distribution organisations must respond in an ever-changing world. Protecting workers and local communities that come into contact with their network equipment requires an array of management tools. Among these challenges is the fact that organisations need to ensure that they stay relevant and up to date, applying good international practice.

This electrical safety toolkit has been developed to support your company and help build on your existing management systems to manage the risk to both workers and local communities. Although some of the tools and resources in this toolkit may not be relevant to your company, we would urge you to review its contents, promote the toolkit to your peers and, where relevant, identify and apply good-practice approaches to your operations.

1 Introduction

This toolkit has been designed to help companies develop their health and safety management systems and processes. Although companies should already have a management system in place, that system is not replaced or superseded by this toolkit. The toolkit is intended to support and complement such management systems and help develop and strengthen them in areas known to be important for accident prevention. It is aimed at anyone responsible for developing a company's management system.

The toolkit is divided into three sections:

Strategic management

Here, the toolkit provides examples, guidance and templates of systems that affect a company's overall management.

Public safety

This section mainly contains templates and guidance aimed at the public. This section will assist companies in raising awareness of the dangers of electrical distribution networks. The guidance documents in this section are designed to be developed to guide the wider public and individual groups.

Internal procedures

This section of the toolkit provides certain documents on a company's internal operating systems. These relate to regular and high-risk activities, where management systems need to be of a high standard to prevent incidents.

Within those three sections, the toolkit contains a mix of the following material:

Example documents

These are examples of how information can be displayed or presented. They can be used to develop a company's own procedures or edited to suit a company's working procedures or local regulations.

Guidance documents

These give more detail about a subject. They should be reviewed before a company develops associated procedures. They may also be used in the company's own guidance systems as a reference.

Templates

Some documents are templates designed for the company to edit, insert their logo and use as their own system. The public safety documents are mainly designed to be tailored to include company-specific information.

2. Strategic management

An organisation's overall strategy must embrace health, safety and the welfare of both workers and the public on a par with other business objectives. This is achieved by implementing a management system. The management system will include strategic systems, starting with a policy on health and safety performance and systems that senior management can implement to develop health and safety performance.

Among its policies, senior management usually sets some objectives that the company must meet on health and safety.

2.1. Setting health and safety objectives and indicators

Setting health and safety objectives is essential if management is to demonstrate accountability for health and safety outcomes. Such accountability includes being able to demonstrate to multiple stakeholders how management is operationalising this responsibility.

Setting these objectives also demonstrates that senior management is aware of critical risks to the business and that they are being managed.

It is important that these objectives be made clear to workers. This allows them to understand the company's requirements and participate more effectively in meeting those objectives. It also gives them confidence that their health and safety is important and that senior management is protecting them.

Objectives are usually set in a policy. Simple objectives may be to meet legal requirements or regulations, to have no accidents, or fewer accidents than the year before. Indicators are required to determine an organisation's progress on an objective. These indicators should be gathered regularly to relay the company's performance to the senior management team and enable it to determine whether objectives are likely to be met.

For instance, a company may have an objective to reduce accidents by 10 per cent on the previous year. This could be ascertained by reporting the number of accidents that occur. The senior management team would quickly realise whether the number of accidents was likely to meet the objective or be higher at the end of the year. This is a reactive indicator.

Reactive indicators are simple records of past events, for example, the numbers and types of accident and incident. However, proactive performance indicators can indicate future direction. For example, a proactive indicator might be the number of safety inspections carried out every month. With more inspections, more defects can be rectified before accidents occur. The same can be said for accidents involving the public. A record of the number of public accidents is a reactive indicator, but the visits to the public health and safety pages of the company website might indicate increasing awareness of the dangers of the distribution system and reduce accidents among the public.

Health and safety performance indicators must be relevant to the organisation. Data must be easily captured and meaningful. Some examples of reactive and proactive indicators are shown in Table 1.

Table 1. Examples of proactive and reactive performance indicators

Reactive indicators	Notes
Number of accidents to workers (this may be further categorised into type of injury)	A frequency rate is often used to show accidents per 100,000 workers
Number of accidents among the public	
Number of employee ill-health cases	A frequency rate is often used to show ill health per 100,000 workers
Number of workdays lost due to work-related ill health or accidents	Work-related ill-ness would be confirmed as occupational disease, although general sickness and absenteeism may also be used
Number/value of damage-only incidents	The value of damage-only incidents may include direct and indirect costs
Proactive indicators	
Number of health and safety reviews, audits and inspections carried out	An indication that health and safety issues are being identified and dealt with
Number of health and safety reviews or inspections by board members	Demonstrating senior management involvement in health and safety
Number of worker training days	Demonstrating maintenance of competence in the workforce
Number of near-miss reports issued	Identifying events that could recur with more severe outcomes; also to indicate common root causes
Number of visits to the public safety section of the organisation's website	Demonstration of increasing public awareness of safety issues

It is important to note that more relevant proactive and reactive performance indicators may be specific to a company's activities. Therefore, the appropriate indicators are selected to ensure meaningful data are used to measure progress towards a company's health and safety objectives.

2.2. Making decisions with good data

Accidents and incidents are key indicators that can provide important information. A robust investigation system should be put in place to determine the immediate, underlying and root causes of all accidents and incidents, and these should be reported to local authorities and financiers. Accidents and incidents are usually categorised by their immediate or initial causes. Many companies also try to identify underlying and root causes; these are events leading up to the accident and why they occurred. This helps identify common accident causes that might not be apparent initially. It also allows companies to understand the behaviours of workers or the public that can lead to underlying issues within the company culture. The toolkit has a **root cause guidance document**, which describes how to identify the causes of accidents. It should be used when developing accident investigation processes to ensure the final report includes the root and underlying causes of accidents.

Gathering more accident data can prove helpful when developing strategies for improving health and safety performance, for instance, considering to whom the accident has occurred and whether it was a worker or a member of the public. It is also helpful in determining what was happening when the accident or incident occurred. If the worker was working, what work were they doing? If it was a member of the public, what were they doing and why were they there?

Having this level of detail can help shape priorities and ensure efforts are focused on those areas that can have the most positive effect.

Although companies may have their own accident and incident reporting procedures with supporting tools, the toolkit provides a spreadsheet tool that may be useful for providing data in a simple format. Some companies use online reporting tools, which can analyse large amounts of data faster. The toolkit's **incident register dashboard** can help to provide information on categories of incident. It is an Excel spreadsheet that creates simple graphs showing accident trends based on data collected during accident investigations. This can be edited to suit the information that companies collect, which they deem relevant and important to the company. It provides a simple chart showing the trends of accident causes and circumstances. This allows managers at various levels to respond to those trends to prevent further accidents.

Capturing the information and presenting it in a concise way will help senior management to understand the performance of the company and identify areas where improvement is required. This allows senior management to make better decisions that have more impact on the company's health and safety performance.

2.3. Communicating performance to stakeholders

Once health and safety performance data have been collected, it is important to communicate them both inside and outside the company.

A good way to share information on the company's objectives and performance is a section on health and safety in the annual report of the company. That section of the annual report can be used to communicate the company's health and safety approach, as well as public safety effectiveness in previous years and planned objectives for the coming years. The toolkit includes an example of how the health and safety section of an **annual report** might look. It contains reporting on existing performance against objectives, information on programmes to improve health and safety, and future objectives the company has agreed.

2.4. Effective health and safety through competence

To improve the smooth and safe running of any electrical network, it is important that companies monitor their workers' competence at all levels. Having workers in positions for which they are not trained or which they do not fully understand can be a risk to themselves, to network operations, to co-workers and to the public. A skills and competence framework is often used to identify the competence required for a given work activity and the skills held by the workers who carry out that activity. This framework will identify who in the organisation requires specific skills and training. To assist in this regard, this toolkit provides a **competence profiling and skills and competency framework**. This can be used to help companies understand competence profiling and develop their own profiles for existing workers when planning future roles and workplace changes.

2.5. Retaining organisational knowledge

It is inevitable that workers within organisations will retire, leave or change roles and their skills will become lost. It is useful to plan for worker changes and for the future to ensure that enough competent workers are available to complete the roles necessary for the organisation to operate safely. The toolkit's **workforce modelling tool** outlines which factors affect overall company competence and how an organisation can plan for change. This is a six-step process that companies should use to develop a more detailed plan on how to maintain a competent workforce in future. Knowledge is a key part of competence and is first gained through training, followed by years of practical experience. However, companies should also explore other sources of knowledge, and these are contained in the toolkit's **knowledge capture tool**. The document gives examples of systems that can be created to provide different levels and types of knowledge to workers.

3. Public safety

Protecting the public from the risks of the electrical network is a key function of network operators. Often, the public does not understand or appreciate the dangers of the electrical network, and education and communication are key to preventing accidents and incidents as well as loss of network service to customers. All these events can have significant effects on local communities. This section of the toolkit provides some suggestions on how to reduce accidents, incidents and loss of network service by engaging with the public.

3.1. Stakeholder engagement

Accident and incident statistics can provide a wealth of information on the types of outcome of those injured or affected by electrical accidents or incidents. The overview of accident investigation in section 2.2 provides classifications of the public by age range, employment type and industry.

From this analysis, it would be possible to identify trends in the types of group involved in accidents or incidents. It may not be possible to allocate resources to all sectors of the public, but engaging with those who are most frequently involved in accidents or incidents will have the greatest impact.

Once these groups have been identified, further stakeholder engagement strategies can be developed. Some example approaches are provided below, but further engagement can be carried out to determine factors for each group:

- **Existing knowledge about electrical safety**

How have the public been engaged in the past and are they aware of the dangers of electricity?

- **Concerns and issues**

What everyday problems do the public encounter at home and at work that increase the risk of an incident – for example, building work at home, the installation of equipment such as aerials and antennas, excavation for new fencing and accessing properties near electrical assets?

- **Media habits and platforms used**

What platforms do the public use to receive information and entertainment?

A different approach can be used to reach younger age groups. It is helpful to work with local schools and offer training materials and presentations that align with relevant parts of the school syllabus. Some examples are listed in the toolkit's resources document.

3.2. Planning

Once initial information has been received, an organisation can plan for specific engagement with the public.

It is useful to identify specific engagement methods, for example:

- direct communication through billing or letters to householders or businesses
- direct distribution of leaflets at events such as trade shows
- information notices on the company's vehicles (for example, contact numbers to the rear of vehicles)
- information notices on a company's assets (for example, fencing around sub-stations)
- public communications (for example, local TV/radio advertising)
- social-media engagement.

Some companies find it useful to create a separate programme for highlighting public safety.

This makes it easier for the public to find safety information quickly and makes the public safety campaign a separate programme within the organisation. Creating a relevant logo also helps to distinguish important public safety information and draws public interest and attention.

3.3. Public communication content

Creating content for public engagement will be based on the initial information gathered in the steps above and will be relevant to the target group. Some general information may be useful to all members of the public, and this can be based on how the electrical network operates and the dangers of electricity to the public, as well as information on some of the commonly held myths about electricity.

The **guidance document on working near overhead cables** provides example information that could be communicated to the public about staying safe near a specific part of the company's electrical network. Companies can edit this information, include their logos and use the document to provide information to the public about working near overhead cables. Certain industries are at greater risk, for example, construction and agriculture, and this guidance can be specifically tailored to them.

It is essential to use appropriate media for each objective. For example, a short video can be useful in explaining the electrical network and its component parts or specific hazards that the public may not otherwise understand. The toolkit includes a **video entitled step potential**, which organisations can adopt to highlight a specific hazard not normally appreciated by the public. Short videos have a greater impact; two minutes are sufficient to pass on key information.

When creating videos, it is useful to start with a script. This is the voice-over of the video, which explains the hazards and control measures. Once this has been done, the length of the video can be determined. The next step is to create a storyboard or graphical representation for the animator to follow. This can consist of drawings, sketches or pictures. It allows the animator to understand what the video should contain. This is often discussed in detail before the animator starts work. The toolkit includes some example scripts, with the step potential **storyboard** of the video as an example, showing how the video was created.

An infographic may be a more appropriate method for passing on brief information quickly. These are usually one-page documents that have high visual impact and contain a lot of information that the company deems important, for example, critical rules or some common misconceptions about safety. The toolkit includes an **infographic** that an organisation can edit and use, adding its own logo and local emergency telephone numbers.

3.4. Creating targeted media

Media should be created that are appropriate to each target group. For example, both construction and agriculture are high-risk sectors with a history of accidents and incidents around electrical networks, while those working for the emergency services may often find themselves in situations involving the electrical network.

Short guidance leaflets can be created, along with additional detailed guidance based on specific issues associated with electrical networks. Although the technical content may appear to be the same, documents may require subtle changes to words and images to appeal to specific target groups.

In the toolkit, there are template leaflets for different sectors:

- **construction industry**
- **agricultural industry**
- **emergency services safety**

These can be used as examples and adapted and edited to suit a specific company's standards. They are intended to be visual and easy to read and contain the main safety points that are important to the target audience. The leaflets can also provide **public safety** content for the distribution company's website.

3.5. Social media

Social media can be a very effective, fast and relatively cheap way of communicating information to large public groups. Initial stakeholder engagement should seek to identify which platforms the public commonly use to find information. This is especially important during electrical network outages, when the public may seek information and share knowledge immediately with others. It is important to ensure that accurate information is passed on quickly to the public, in addition to what steps they need to take to ensure they remain safe.

Example of social media use

During an electrical network outage, the network operators' control room notifies the media or communications team, which places an update on the front page of the company's website:

"We are aware of a power cut [north of A City]. Our engineers are working to restore power and we hope to have the situation resolved shortly. Further updates will appear here. For automatic updates follow us on [social media account]."

The post also contains a link to the webpage offering safety information for the public to follow during an outage.

Further safety information is issued as the situation develops, including, if possible, the likely timescale for service to resume or the next service update. Every message includes a link back to the webpage offering safety information.



3.6. Measuring performance

Engagement with the public is an effective way of demonstrating to stakeholders the efforts being made to protect the public from harm from the network. This can be measured in a number of ways. Hosting public safety information on a company's website will facilitate a simple measure of the number of individual visits to that webpage. This should be benchmarked before any public engagement plan is implemented to ensure that any subsequent increase in visits to the public safety information webpage is measured.

A number of steps can be taken to increase awareness of the webpage location:

- Include a link to the public safety webpage on every company email.
- Include the address of the public safety webpage on all company documents sent to the public.
- Include the public safety webpage address or a QR code on electrical network assets, such as poles and gates.
- Include examples of stickers for high-risk vehicles such as cranes, tractors and excavators.

To demonstrate the effectiveness of public engagement, a number of measurements can be taken, for example:

- visits to the public safety webpage on the company's website
- number of document downloads
- social media engagement on posts relating to public safety

There may be other elements that are useful for measuring public engagement performance. Collating this information can prove useful in determining whether the programme is working and provide valuable data to senior management when determining strategy.

4. Internal procedures

It is commonplace for organisations to have a management system covering health and safety that meets external standards such as ISO45001. Generally, these systems provide an organisation with a framework of procedures, but sometimes, more detailed instructions are required for the health and safety of the workforce.

1. Asset management

One of the main issues a company must consider is the management of its assets across its network. Incidents can occur, for example, due to equipment failure, or failure to inspect and maintain the system (systematic failure). It is useful to formulate a strategy for dealing with how **asset management** is approached to ensure high-risk assets are managed effectively and in a cost-efficient manner. An example philosophy is included in the toolkit's asset management document. This will assist in developing specific internal company procedures to manage assets and the types of output a procedure should produce.

4.2. Distribution safety rules

Companies should provide a safe system of work for their workers, including contractors, and create specific procedures for the safe operation of the network. Often, these procedures are separate from an organisation's normal management procedures and specific to operating the distribution system. It is useful to consider these procedures as an instruction book for workers when working on the network. They are sometimes referred to as distribution safety rules, which may be different to more general safety rules. An outline example of the types of procedure contained in a set of **distribution safety rules** is provided in the toolkit.

The distribution safety rules are very detailed and often contain a mix of diagrams and detail on how a specific task should be carried out. High-risk tasks should be assessed, and a safe system of work should be agreed upon before a specific rule is created. There are two examples in the toolkit. The first is **demarking work areas in a substation with open terminals**. This is an example of a procedure within a set of distribution safety rules that shows how it can be laid out with drawings to provide simple safety instructions when working on the network. This rule involves text and a diagram of how the activity is to be carried out. The **best practice in switching document** can assist in creating specific rules for switching activities. These rules are non-negotiable and should be set and agreed with senior engineers before being implemented and provide a suitable auditing platform for regular worker checks.

4.3. Supporting internal guidance

In any management system, a procedure may be worded in a simple manner, but the decisions behind the procedure may be more complex and require further guidance. A good example is the selection of personal protective equipment (PPE) when working around live electrical equipment to protect against the risk of arc flash or flashover. This is to protect workers and others in the vicinity of the extreme temperatures that occur during an arc flash. Although it is the last line of defence as a control measure, PPE can also reduce the level of injury should an accident or incident occur.

Selecting PPE to protect workers can be challenging, and understanding the different levels of protection it affords requires some investigation to ensure the correct PPE is selected for the task. The toolkit includes an example of **internal guidance on the selection of arc flash PPE**. However, engagement with PPE manufacturers and suppliers will provide better insight into the correct protection for workers.

Companies may have other complex decisions that are not covered by the distribution safety rules and should consider a library of guidance that supports some of the decision-making when developing procedures.

4.4. Third-party agreements

Sometimes, third parties or private network operators will work in close proximity to the electrical network who may not fully appreciate the dangers of electricity or are not aware of the safety rules. Where a third party is not a network operator, agreement should be reached on the rules to be followed to ensure the safety of both parties. The toolkit includes a **model agreement**. This outlines how an agreement should be viewed and structured.

4.5. Protecting the public

Some processes may need to be put in place for when the public is at risk of interacting with the organisation's network assets. The most common is likely to involve working around overhead cables, where there is a risk of contact. Such situations may require the public to contact the distribution company and request support. This would require the company to develop a procedure for dealing with the request.

The toolkit contains an example system for dealing with a request from the public involving the issuance of an **exclusion zone permit**. After measuring the height of the lowest network asset, the permit is completed by the distribution company, giving advice to the public on how they should proceed, safe distances and how to set up an exclusion zone. Measuring overhead cable heights can be done accurately and safely with an ultrasonic measuring device and the safe distances available in the **working near overhead cables document**.

5. Resource repository

Within the **resources document**, there are links to other resources, including:

- regulators, showing laws and guidance from other countries and how they are approached
- resource bodies that promote safety around electricity and which have resource documents that can provide inspiration and guidance to organisations creating their own documentation
- electrical distribution organisation websites, showing how they create their own public-facing safety information school resources, showing how some organisations have engaged with young people specifically around electrical safety.

While the toolkit contains a number of resources it is useful for companies to review and research other resources that have been published or are being developed

Tools and resources

Below are direct links to the tools and resources referenced in various sections of this document.

- **Agricultural industry** [PPT](#) | [PDF](#)
- **Annual report** [PPT](#) | [PDF](#)
- **Arc flash Protective Equipment** [PPT](#) | [PDF](#)
- **Asset management** [PPT](#) | [PDF](#)
- **Best practice in switching** [PPT](#) | [PDF](#)
- **Competence profiling and skills and competency framework** [PPT](#) | [PDF](#) | [DOC](#)
- **Construction industry** [PPT](#) | [PDF](#)
- **Distribution safety rules** [PPT](#) | [PDF](#)
- **Electrical safety Resources** [PDF](#)
- **Emergency services safety** [PPT](#) | [PDF](#)
- **Exclusion Zone Permit** [DOC](#) | [PDF](#)
- **Homeowner safety** [PPT](#) | [PDF](#)
- **Incident register dashboard** [XLSX](#)
- **Infographic** [DOC](#) | [PDF A3](#) | [PDF A4](#) | [PDF A5](#) |
- **Knowledge capture** [PPT](#) | [PDF](#)
- **Model agreement** [PPT](#) | [PDF](#)
- **Open terminal substation demarcation** [PPT](#) | [PDF](#)
- **Root causes** [PPT](#) | [PDF](#)
- **Step potential** [PPT](#) | [VIDEO](#)
- **Scripts** [1](#) | [2](#) | [3](#) |
- **Workforce modelling** [PPT](#) | [PDF](#)
- **Working near overhead cables** [PPT](#) | [PDF](#)

