**Hazard identification**

**Who is the guidance for?**

This guidance on Hazard Identification in the Community Risk Management Planning (CRMP) process is for those tasked with leading and managing and developing the CRMP for UK Fire and Rescue Services. According to the [CRMP Approved Fire Standard](https://www.firestandards.org/standards/approved/community-risk-management-planning-fss-rmp01/), fire and rescue services must:

**Identify and describe the existing and emerging local, regional and national hazards it faces, the hazardous events that could arise and the risk groups (People, Place, Environment and Economy) that could be harmed.**

In 2020, the NFCC’s Community Risk Programme (CRP) through its Definition of Risk (DOR) project, delivered a national definition of risk, a **glossary of risk-related terms** and a conceptual risk framework for the UK Fire and Rescue Service, to help bring national and local consistency to community risk management planning.

It is important to note that the whole CRMP process is underpinned by three key themes that should support, influence, and inform each individual component throughout the whole process:

* **Data and Business Intelligence.**
* **Equality / People Impact Assessment (EqIA).**
* **Stakeholder and Public Engagement.**

These themes should be utilised to ensure each component within the process has been developed using a broad range of community and organisational intelligence, and links are made throughout this guidance.

Individuals within a Fire Service who work to develop a CRMP may differ between fire services and may differ from one cycle of CRM planning work to the next. With these acknowledgements in mind, a series of **competency frameworks** have been developed which aim to clearly articulate the requisite competencies (behaviours, skills, knowledge, experience, and techniques) required to undertake CRM planning**.** Within the competency frameworks the requisites are outlined for strategic level staff members, as well as risk analysis and implementation level staff members.

**Overview**

The purpose of hazard identification is to find and describe hazardous events that might prevent, or help, a Fire Service to achieve its community risk management objectives, and to which it will deploy its resources.

This involves selection of:

* Hazards – potential sources of harm
* Hazardous events – potential events that can cause harm
* Risk groups – people or assets that could be harmed

**Hazard**

*What are the potential* ***sources of harm*** *that could impact risk groups?*

The DoR project tells us that a hazard is defined as “a potential source of harm”. This is distinct from “risk”, which includes the likelihood of the harm occurring and also its severity. This is a well-known distinction in the safety field, although the term “hazard” is uncommon in other risk fields. The distinction has the advantage that hazards can be described in purely practical terms, without raising the theoretical question of how likely they are to occur.

Hazard identification can involve historical data, theoretical analysis, informed and expert opinions, and forward-looking judgements. You should identify emerging or foreseeable hazards. Internally, you should involve colleagues. Externally, use external sources such as the Community and National Risk Registers, subject matter experts, and academia. See the **Community Risk – Data and Intelligence Guidance**

Your hazard identification should involve, and therefore reflect, stakeholders and their needs. Involving a wide range of stakeholders gives a greater chance of being able to define the Fire Service’s risks well. Involving others in hazard identification also helps to understand the need for controls or the deployment of resources in a certain manner (**Decision Making** component of the CRMP process). It helps to build confidence in the decisions that you make. See the **Community Risk – Stakeholder and Public Engagement Guidance**

It will be helpful to categorise the hazard identification by groups (perhaps by theme, activity, source, and so on) to help the task of identifying hazardous events. You could use the themes shown in the visual or use the themes you used when describing Scope. One of the outputs of the DoR Project was a Hazard Identification model developed by Cleveland Fire and Rescue that grouped potential sources of harm to five main groups – see figure 1. Here, emerging / foreseeable risks are included that may impact on Community Risk.

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| --- | --- |
| **Identify Hazards (Community)** | ***Examples***  |
| Structures | Domestic Residential BuildingOther BuildingsUtility SitesUnderground TunnelsLicenses waste sites |
| Transport | RoadRailAir Marine |
| Industrial | HazMats SitesHazardous Transport |
| Environmental  | Wildfire Waterways |
| Malicious Attacks/Terrorism  | Marauding Terrorist attack  |
| Emerging / foreseeable  | Climate Change |

It might help organise the hazard identification activity by assigning the responsibility for hazard identification to the owner of the Service’s objectives that relate to community risk.

In the hazard identification part of the process, there is no strict need to be concerned about the likelihood of occurrence of the hazardous event(s). However, this information does need to be considered as part of the **Risk Analysis** part of the process. With that in mind, it is advisable when planning your data/evidence collection approach (**Data and Business Intelligence guidance**) and stakeholder engagement strategy (**Stakeholder and Public Engagement**) that you maximise opportunities by seeking out data relevant to both hazard identification and Risk Analysis in tandem.

Carried out thoroughly, the hazard identification process will reveal the ‘*what, where, when, why and how’* hazardous events could happen, and the range of possible effects on objectives (i.e. the ‘consequences’). It should be known that the ‘what, where, when, why and how’ of hazard events overlap and interrelate, for example the ‘when’ and ‘why’ of a hazardous events often share a causal relationship. However, such relationships are subject to continual change as communities shift and develop and new hazards are introduced. It is therefore also essential to have frequent conversations about risk to maintain a continual refresh of hazard identification.

**Tips for effective hazard identification:**

* Ensure that the Scope is fully established (**Defining Scope**).
* Gather, consolidate, and analyse relevant historical information and data.
* Horizon scanning of emerging risks.
* Involve people with wide ranges of experience in the CRMP process.
* Ensure that hazards are clearly described and that each hazard is distinct from other identified hazards with no overlaps.
* Pin down the level of depth for both Hazard Identification and **Risk Analysis** beforehand and consolidate evidence gathering and stakeholder engagement methods to meet the needs of both stages.
* Record the output fully and preserve the record for future reference and evaluation. Records should refer to the statement of Scope from which the hazards were identified.

**Hazardous Events**

*What are the potential* ***events******that could lead to a hazard*** *causing harm to a risk group?*

The DoR Report documents that Hazardous events are specific potential events that can cause harm. They differ from hazards as follows:

* Hazardous events are specific occurrences, so that they can be counted and quantified. For example, if the hazard is “a high-rise building”, the corresponding hazardous event might be “fire in a high-rise building.
* Hazardous events are mutually-exclusive, so that their risks can be added up. For example, two hazards might be “a high-rise building” and “dwelling fire”, but the corresponding hazardous events must eliminate the overlap, such as “high-rise building fire” and “low-rise dwelling fire”.
* Hazardous events are representative of the range of such events that might occur, so that it is practical to assess their risks. For example, a hazard such as “dwelling fire” might be split into “minor”, “severe but contained” and “uncontained”.

Hazardous events might have more than one type of consequence. Therefore, they might affect more than one of the Service’s objectives determined in the **CRMP Scope.**

Creating a list of hazardous events that is expressed in terms of ‘events’ helps later when determining control and resource requirements. One of the outputs of the DoR Project was a Hazard Identification model developed by Cleveland Fire and Rescue that maps potential sources of harm to potential hazardous events. Here, there is also foreseeable/emerging hazards included that can impact on community risk:

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| --- | --- | --- |
| **Identify Hazards (Community)** | ***Examples***  | ***Hazardous Event***  |
| Structures | Domestic Residential Building | Building fire |
| Other Buildings | Building fire |
| Utility Sites | Fire |
| Underground Tunnels | Collapse |
| Licenses waste sites | Waste Site Fire |
| Transport | Road | Road Traffic Collisions |
| Vehicle Fires |
| Rail | Rail Collisions |
| Rail Fires |
| Air | Air Traffic Accident |
| Marine | Water Rescue |
| Vessel Fires |
| Industrial | HazMats Sites | Fire involving HazMats |
| Explosion |
| Release Leak/Spillage |
| Hazardous Transport | Road Traffic Collisions |
| Vehicle Fires |
| Product spillage |
| Environmental  | Wildfire | Wildfire |
| Waterways | Flooding Inland / Coast |
|   | Water Rescue |
| Terrorism | Marauding Terrorist Attack (MTA) | Marauding Terrorist Attack (MTA) |
| Chemical, biological, radiological or nuclear (CBRN)  | Chemical, biological, radiological or nuclear (CBRN)  |
| Emerging / foreseeable | Climate Change | Flooding inland / Coast |
| Heatwaves / wildfires |

There might be some activities the Fire Service carries out that do not arise from these themes, for example a community activity that has an ‘upstream’ link with fire causation. These might have the potential to meet broader social objectives and could be seen as being an ‘opportunity’. Therefore, they should be identified within hazard identification.

Although identifying community risk should be comprehensive (and therefore consider all significant causes and consequences) it does not have to describe every possible outcome of every stage of every possible sequence of cause and effect. Its purpose is to identify sufficient hazardous events to characterise the risk so that there is a reliable basis for **Risk Analysis.**

It is important to obtain input from a diverse range of sources. Seeking a variety of views, including the views of external stakeholders as well as colleagues, and those in neighbouring Fire Services, will help avoid group think or tunnel vision. It also might provide further understanding of risk and overcome any misconceptions. See the **Community Risk – Stakeholder and Public Engagement guidance.** Closely related to stakeholder and public engagement is the need to undertake a proper Equality Impact Assessment, in order to ensure inclusivity for all communities, service users, and employees who share the characteristics protected by the Equality Act 2010. As one of the key themes featured within the CRMP Strategic Framework this Equality / People Impact Assessment/s (EqIA) should be considered at each stage in order to ensure that each component of the process is being supported by the broadest range of evidence and intelligence available (**Community Risk - Equality Impact Assessment**).

**Risk Groups**

***Who or what*** *within the community is at risk of coming to harm?*

Risk groups are relevant throughout the assessment, defined as the people or assets that could be harmed by hazards. They should be defined by the scope and objectives of the study, as they are the people and assets that the FRS aims to protect. The NFCC Protection team have grouped risk groups into the six categories, which require a different primary intervention, or a range of interventions by the Fire Service to support the reduction of risk.

The **Risk Analysis** should consider the likelihood and consequence of hazardous events on each group and combine them to form risk metrics appropriate for each. There may be separate risk criteria for each group.

**Risk Groups**

Risk groups are sets of people or assets that are exposed to the risk and might be harmed. The risk groups that are relevant in community risks include: The DoR project defined six risk groups relevant to community risk, with an additional two groups under operational risk:

1. People, i.e. members of the public.
2. Property, including dwellings, commercial property, community assets etc.
3. Business, including possible interruption of revenue-generation.
4. Heritage, including buildings or places of particular historical value.
5. Environment, including physical and ecological aspects of air, water and land.
6. Community, including possible social concern, media reaction and community disruption.

Operational risks involve the following additions to the first two risk groups: Emergency responders and FRS equipment.

**See Appendix 1 for examples of Hazard Identification techniques.**

**Appendix 1 – Hazard Identification Techniques**

It may be necessary to examine external resources in developing an approach to hazard identification. Hazard identification is not a new approach to risk management and a variety of organisations, emergency services, militaries, and government bodies have existing approaches and techniques that it may be useful to reflect on in CRM planning. A selection of such references is contained in this appendix.

*“Whatever techniques are used, good hazard identification depends on experience and imagination” Ministry of Defence (2018)*

MOD’s Safety Manager’s Toolkit includes information on several Hazard Identification techniques such as:

* Hazard checklist
* HAZard and OPerability Studies (HAZOPS)
* Structured What-If Technique (SWIFT)
* Failure Mode and Effects Analysis (FMEA)