How we analyse and model risk

Why do we analyse risk?

Analysing risk helps support decision making. Our strategic analysis team closely examines lots of data and information, transforming it into intelligence. We then use this to evaluate different options.

Where does the data come from?

- Our own incident data – what we've attended/not attended, what we've sent to incidents, what happened
- Our own crewing availability data
- Experian Mosaic - a dataset of types of households and where they are
- NHS England (GP registrations) - data about the location of older people
- Businesses Data – Experian Mosaic data about types and location of businesses along with likelihood of fire
- Office for National Statistics - information about people, ages, as well as population projection estimates
- Partner organisations, such as police, health, local authorities.
- English Heritage – data about listed buildings and thatched buildings
- Department for Transport – road network and road safety RTC database
- Ordnance Survey - mapping

How we assess risk

When we assess risk, we look at a small geographical area - census output areas. This might be a residential street in Yeovil, a few cul-de-sacs in Wellington, half of uninhabited Dartmoor, or even a single large tower block in Plymouth. If we looked at anything more detailed, such as individual dwellings or premises, it would not give a much better indication of risk, as well as becoming extremely complex to analyse. Sometimes we may also look at risk within our whole Service area.

What formula do we use to assess risk?

We use human, (local knowledge or subject matter expert, or professional judgement) as well as analytical methods for assessing risk.

We look at both likelihood and severity of a risk, rather than just those elements on their own. This is because there may be incident types that are very rare, but that could have a significant impact. For example, the Grenfell Tower fire.

We also use subject matter experts

We have many experts in risk at Devon and Somerset Fire and Rescue Service. When we analyse risk we always take account of local knowledge and the professional judgement of subject matter experts as part of the validation of our models. For example, a particular building may have specific risks attached, (perhaps Exeter Cathedral, tower blocks in Plymouth, or Hinkley Point), and therefore we may regularly inspect it.

What does 'risk modelling' mean?

A model is a way of taking data and measurements from the real world and simulating what happens when we fiddle around with them.

For example, we can model what might happen if we took a fire engine away, or if we moved a station from 'wholetime crewing' to 'on-call', or if we closed a station. Our model tells us what impact those changes would have on the likelihood of fatal incidents in those areas.

On a computer you can run simulations thousands of times, each with very subtle changes to see what happens.

Our response modelling tool
With the information we have available about our crews, appliances and stations, we can then look at estimated travel times for appliances to locations across Devon and Somerset. This is our response model.

Our response modelling tool can be used to assess how changes in response arrangements - such as crewing patterns - would affect the expected life risk from dwelling fires and RTCs which means we can compare different scenarios and the current situation.

Other methods we use to help our response planning

We also create maps showing where different resources can respond to aid our response planning. This is usually shown on a map as 'isochrones' which highlight where an asset (vehicle) can drive to in a certain amount of time. This helps us choose the best locations for assets including special appliances, as well as helping us to see how well covered certain locations are.

How we created our response modelling tool
This tool was developed from the Fire Services Emergency Cover Toolkit (FSEC) which itself was developed following national research. The model we use was originally developed by Greenstreet Berman, one of the UK's leading independent human factors and safety culture consultancies.

How we check the model works

We need to ensure that the model works, so we use a combination of the professional judgement of officers as well as looking at past incident data mapped against a theoretical future incident. We can then tweak the model to reflect that input and see how that affects the outputs.