

Calm before the storm

Geography helps insurance companies calculate catastrophe risk across the world. **James Nolan** describes how the industry benefits from the latest geospatial techniques

The insurance industry has long recognised the value of mapping. The large-scale plans of urban areas compiled by Charles E. Goad in the 1880s set the standard on precise mapping and detailed attribute data and were used by insurers to assess fire risk. Building footprints, number of floors, height and construction materials were all used to

estimate premiums. The British Library holds a comprehensive collection of fire insurance plans for most important British towns and cities - and for many overseas.¹

Modern digital versions of these town plans still provide accurate area and attribute data for commercial properties and are widely available for high streets in the UK. Building footprints have also been used to map industrial, leisure and residential property assets for some years. The recent release of building outlines in America has opened a new way of geo-referencing dwellings and commercial properties to identify insurance risk. The attribute data of an insured building may include structure type, roof type, presence of storm shutters and policy details. Accurate geocoding allows the attribution of these details to the building outline.

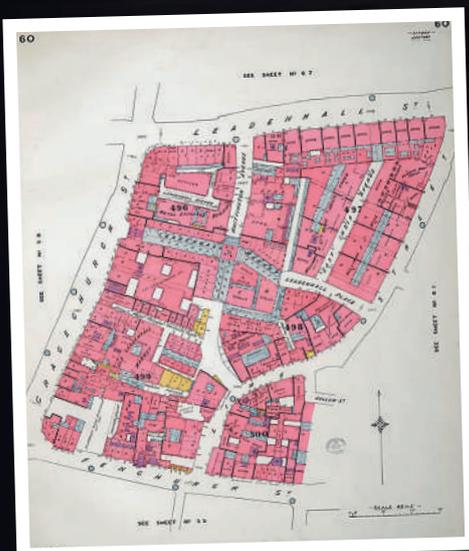
Eye on the storm

When precise property information has been established, the risks related to geographical phenomena need to be considered. The National Hurricane Centre² maintains a rich source of digital data for hurricanes occurring across the globe. Some 1,200 comparable storm tracks are recorded dating from the 1850s. Storm types, coordinates,

wind speeds dates and times all make this a valuable resource which is used with current GIS technology. The study of damage from previous storms provides ways to quantify the impact on property - and help predict the insured risk of any future storm.

A hurricane's landfall location is often considered to be the most relevant event. However, this marks the point a hurricane loses its warm water energy source. Prior to this point, damage can be predicted because water is often more damaging than wind. Storm surge and floods generated by rain both present a large insurance risk; understanding susceptibility to these threats is of paramount importance. The Geospatial analyst calculates flood risks in designated areas - which are constantly being adjusted as new data is added.

The choice of how geographical data is represented is important. A projected coordinate system with X and Y coordinates may provide more accuracy over smaller areas. Hurricanes, however, travel thousands of miles, are hundreds of miles across and frequently change their status. A geographical coordinate system that is applicable globally is better for capturing and displaying these events. Understanding hurricane data and consequent



Charles E Goad's plan of Leadenhall and Lime Street, London

computational transformations should also be part of every insurance risk analysis. Hurricanes do not simply create a line on a map; they knock buildings over and push premiums up.

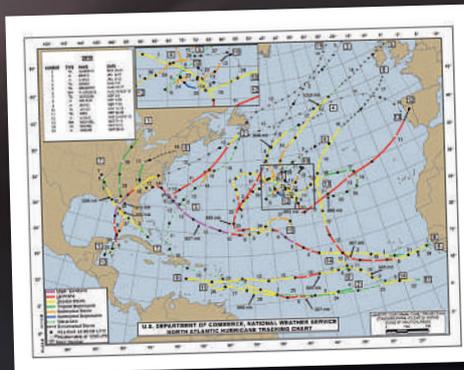
Ground-breaking data

The weather directly influences property insurance and extreme events influence building design and construction. The mandatory insurance required in some locations impacts sales. Other phenomena - earthquakes, sinkholes and fire - also influence the property market.

A map layer surface can assist fire risk assessment by indicating the proximity of vegetation, slope angle, prevailing winds and accessibility; properties with higher risk can be insured to the correct level. This GIS surface generation can be extended to include many data sources, providing a 'score' for different insured risks.

System approaches

Geography has a long history of supporting both the property and insurance business. Experienced analysts are constantly seeking to increase profitability; they work effectively because they know what is needed, where to find it, and how to maximize the use of geospatial data and GIS.



National Hurricane Centre Atlantic basin storm track map

It is clear that the insurance business needs to identify where risk is greatest from severe weather. There are broadly two GIS approaches. A software solution can be produced - which is then 'developed' by adding georeferenced business data and relevant external data sets. (Geoprocessing functionality and detailed analysis is then possible for the catastrophe analysis team.)

Alternatively, a wider business approach is taken to distribute both geospatial data and geographic analysis functionality to a large number of users. This requires secure data sharing, automation of updates and an efficient, tailored user interface. (The benefits of current and consistent data are shared via a secure web-based application.)

Going Full Circle

Insurance claims submitted after a severe weather event are assessed as quickly as possible; precise location data is essential to get assessors to the correct places. Aggregate counts by county or postcode areas are not sufficiently exact to determine the path, or full extent of a hurricane impact.

Mapping techniques establish the true extent of a wind swathe - and the speed and destructive nature of a storm at a given location. This reduces false claims and benefits insurers and their customers.

Geography and GIS applications underpin the insurance industry. As more geographical data is collected and analysed, insurance risk prediction will become more accurate - and more profitable.

References

1. <https://www.bl.uk/onlinegallery/onlineex/firemaps/curatorintro154662.html>
2. <https://www.nhc.noaa.gov/>

James Nolan (www.Jimnolan.uk) is a freelance PropTech consultant, using commercially available digital plans with proprietary GIS to create online 3D-viewable models



GIS and web mapping

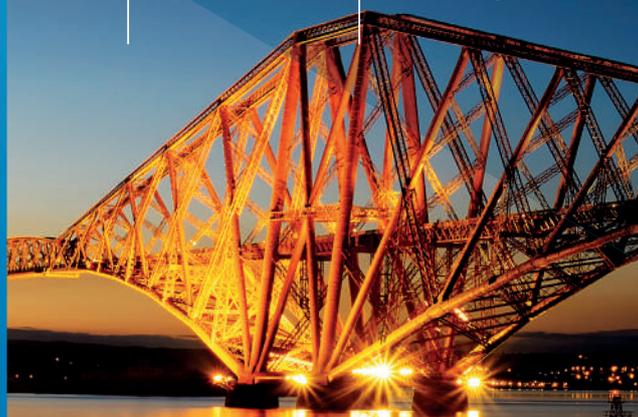
Making it easier to analyse, visualise and share spatial data between people and between systems



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