

Storm wave study could bring better coastal defences

Julia Horton

A new system to predict the danger zones when vast waves batter coastal communities could help to prevent people from being swept out to sea, Scottish scientists said yesterday.

Academics at the University of Edinburgh studying the way giant waves collide with sea defences have identified distinctive patterns in the way that jets of water crash over the top of harbour walls, at speeds of up to 100mph.

Researchers have used their findings to develop a statistical programme to forecast where the millions of tonnes of water will slam down as it collides with sea walls, buildings and cliffs.

They hope that the breakthrough will improve safety measures to reduce the death toll around the nation's coastline. Each year across the UK about 12 people on average are estimated to be swept to their deaths after deliberately going out to the coast to watch stormy seas or being caught by freak waves.

The advance in understanding will also be used to protect people and property by improving the design of ageing sea defences across the UK and the rest of Europe, which were not built to withstand the increasingly violent storms brought by climate change.

David Ingram, of the university's school of engineering, who co-wrote the study, said the growing frequency and intensity of storms made it critical to understand how waves hit the coast.

He said: "We have known for some time that when waves hit a wall a powerful jet of water is thrown up into the air which travels much faster than the wave but this is the first time we have been able to describe the distribution of that water and assess where the wind can carry it.

"It would be useful if the owners of seawalls — often councils — could in-

clude this information in their decision-making. It could help them to decide that a sea wall should be closed in certain conditions to stop people going out or provide guidance on where to put

warning notices. As soon as it gets stormy, a lot of people will go out to see the spray and they don't see it as dangerous, but it is."

HR Wallingford, a leading coastal engineering firm and former UK government agency, is expected to use the Edinburgh study to update a design manual for European sea defences. Tim Pullen, principal engineer, said: "We did some work a few years ago and estimated that on average about a dozen people each year are swept off sea walls either by rogue waves or during storms.

"People are drawn to look at storms if there's a 'nice safe point' to stand but these 'safe' points are not always actually safe. This study is a step forward [in helping to protect the public]."

The Scottish Environment Protection Agency, which deals with coastal flooding, said that the study provided "valuable insight" that could help keep communities safe.

In 2011, Eryk Cieraszewski, 3, died after being swept to sea from the esplanade at Kirkcaldy in Fife.

Fife Council has since built a new £9 million seawall — which had been planned before the tragedy — in the town. A spokeswoman said that the local authority would consider the study and "investigate any potential impacts" for the region's sea defences.

This summer the dangers of beaches and rocky shores were highlighted as six people died around the UK coast in one weekend including Julie Walker, 37, and her son Lucas, six, from Aberdeen, who died on the city's coast. The deaths coincided with strong winds, high tides and surging waves across Britain.

The Maritime & Coastguard Agency

said: "We cannot stress enough that piers, rocks, harbours, sea walls and the water's edge are not safe places to be when the weather is bad."

The study, conducted with scientists in Japan at Hokkaido University, was based on laboratory work recreating stormy sea conditions in a 24-metre wave flume. It was published in the Royal Society journal *Proceedings A*.





DANNY LAWSON/PA

Waves hit the foreshore in unusual ways during storms, throwing jets of water at high speed that can wash away spectators

Ref: 118200636

