

R&D Technical Summary FD2317

Flood Risks to People Phase 1

Background to R&D project

Flooding can cause damage to properties and other assets, and can also cause death and serious injury to people. The overall objective of the project is to develop a methodology for estimating the risk of death or serious harm to people caused by flooding.

The project covers direct impacts of the flooding, both during and up to one week after the event, including

- death (usually drowning) as a direct and immediate consequence of deep and/or fast flowing floodwaters
- physical injuries as a direct and immediate consequence of deep and/or fast flowing floodwaters
- deaths/physical injuries associated with the flood event (but occurring in the immediate aftermath).

The results from the project are intended to support the aims of risk management and risk reduction, including:

- the planning and targeting of flood warning schemes by the Environment Agency
- emergency planning and response procedures by emergency planners and the emergency services.
- the planning of flood defences, by taking risks to people into account
- development planning and regulations, by taking risks to people into account in proposed developments.

The project is divided into two phases. Phase 1 is concerned with evaluating existing knowledge, identifying main risk factors, and developing a preliminary methodology for assessing risks to people. Phase 1 also identifies research needed for further development and testing in Phase 2.

This project complements a parallel project on longer-term health impacts of flooding on people (FD2005). The framework for risk assessment is based largely on the earlier R&D project FD2302 (Risk, Performance and Uncertainty Review).

Results of R&D project

The main research results of Phase 1 of the project are:

- review of national and international literature and experience on death and serious injuries arising from flooding
- identification of the factors that cause death/serious injury to people
- a methodology for estimating the likely number of deaths/injuries
- identification of the research needed to develop the methodology

The main factors that cause death/injury to people during or immediately after floods include flow velocity, flow depth, and the degree to which people are exposed to the flood (the “exposure potential”). The exposure potential is related to such factors as speed of onset of flooding, availability

and quality of flood warning, size of floodplain, location on floodplain, type of accommodation, etc. An important case where flooding can occur suddenly and without warning is where flood defences overtop or fail. In addition, risks to people are affected by social factors including vulnerability of the population and behaviour during floods.

Research has already been carried out relating the risk of death to many of these factors. This research has been analysed and a preliminary method has been developed for estimating flood risk to individuals and groups. The method requires data on a range of factors including characteristics of floods, floodplains and the affected population. The data are already available or can be derived from existing or planned data sets and models. The method has been tested on a small number of contrasting historic flood events.

These initial results are encouraging but further development and testing is needed in Phase 2, namely:

- Research to refine the methodology including:
 - linking flood hazard to risks to people
 - the impacts of flood warning on risks to people
 - linking social vulnerability and behaviour with risk of injury/death
- Research to apply the methodology within a GIS based system for risk mapping, including:
 - calculating the flood hazard
 - development of a map-based approach
- Pilot testing
- A guidance document on assessing and managing flood risks to people for use by a range of stakeholders.

R&D Outputs and their Use

The project produced an R&D Technical Report and this document. The R&D Technical Report contains the results of Phase 1 of the project and includes the preliminary methodology as well as recommended research and other work needed for Phase 2 of the project (FD2321). It should be used to inform stakeholders of the work carried out in Phase 1 and the proposals for Phase 2.

This R&D Technical Summary relates to R&D Project FD2317 and the following R&D outputs:

- **R&D Technical Report FD2317 - Flood Risks to People Phase 1.** Published in July 2003

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The above outputs are available on the Defra website (www.defra.gov.uk/environ/flood). Copies are held by all EA Regional Information Centres and can be purchased from the EA's R&D Dissemination Centre, c/o WRC, Frankland Road, Blagrove, Swindon, Wiltshire SN5 8YF (Tel: (+44) 1793-865012; Fax: (+44) 1793-514562; email: publications@wrcplc.co.uk).

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