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A fire risk assessment technique for educational establishments

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Teaching methods

Victor Hrymak and Noel O'Reilly outline a method of assessing fire safety management in large educational establishments

AN EVALUATION of the fire safety management provisions of an organisation is critical in carrying out a fire risk assessment in accordance with the Fire Precautions (Workplace) Regulations 1997, as amended. However, the actual methodology of fire risk assessment is not codified and it has been argued that there is no accepted way of carrying out such an assessment[1]. This means that, in practice, fire safety professionals have to bring their own expertise and methodologies to bear upon the risk assessment process.

Fire risk assessment can be defined as 'a broad term that could be applied to any activity that involves checking, measurement, evaluation and the real fire-related performance of any fire safety system and any subset of such systems'[2]. Approaches currently used by fire safety professionals when undertaking assessments include knowledge-based surveys, analytical approaches, computer-aided analyses and computational fluid dynamics.

One particular fire risk assessment methodology is set out in the Scottish Fire Service document, *A guide to fire safety risk assessment*, published in 1999. This guide requires the user to consider eight fire safety aspects, including prevention and management. The National Health Service estates section, meanwhile, has issued Health Technical Memoranda 86: *Fire risk assessment in hospitals*, which describes a fire risk assessment methodology for hospitals.

However, one aspect that these approaches have in common is that there is no laid down guidance on how to evaluate the effectiveness of existing fire safety management systems. In contrast, the health and safety community has long understood the importance of measuring the impact of existing safety management systems. In particular, the Health and Safety Executive says that most industrial accidents are, in some measure, attributable to human as well as technical factors, in the sense that actions by people initiated or contributed to the accidents, or people might have acted better to avert them. As a result, it has been argued that, since most accidents are caused by the failure of management systems, quantified risk assessment must take into account local safety management practices, or else it will not provide reliable information[3].

Methodology and procedures

With these considerations is mind, a methodology was developed by the authors to evaluate the existing management system. The methodology chosen was based on earlier work developed by the Aerospace Psychology Research Group in Trinity College, Dublin[4].

The premises selected was a single-site educational establishment located in an urban area. The establishment comprised multiple buildings used by over 300 staff and a daily student population averaging 4,000. Buildings on the site date from turn of the century, through to buildings completed and occupied within the last three months.

The methodology consisted of three distinct procedures. Firstly a building fire safety survey of the premises was performed in accordance with the Scottish Fire Service guidelines on carrying out fire risk assessments to ensure compliance with relevant fire certificate and building regulation requirements.

Secondly, a questionnaire was sent to 125 staff members. The questionnaire was divided into four sections:

- **Fire safety knowledge:** Staff were asked if they had received fire safety training and if they knew where the assembly points were located
- **Fire safety behaviour:** Staff were asked how they would leave the building if they were instructed to evacuate or if they heard a fire alarm – for example, whether they would use the entrance they used when arriving at work, or the nearest fire exit, or whether they would follow other people
- **Fire safety attitude:** Staff were asked if they thought fire safety was necessary and whether the level of fire safety in the workplace was of a high standard
- **Fire safety culture:** Staff were asked if they thought management maintained good fire safety practices at work and, if fire safety rules are broken, whether management took action

The third part of the methodology was a series of semi-structured interviews with senior management to assess the pro-active and reactive fire safety management procedures in place. Interviews were held with six members of senior management within the organisation. A number of directed questions were given and the answers recorded. The questions, based on BS 8800: *Guide to Occupational Health and Safety Management Systems* (1996), were designed to elicit information on policy, organisation, planning and implementation of fire safety issues.

Survey results

The results of the building fire safety survey, as expected, identified items of disrepair and sub-standard conditions within the buildings, such as non-closing fire doors, breaches in fire compartment walls and the storage of combustible materials in escape routes.

However, the results of the questionnaire and interviews provided additional data, which enabled a better understanding of the organisation's ability to deal with fire safety. In particular, the questionnaire results revealed that the level of fire safety training in the organisation varied with the building concerned, with between 80 and 90% of occupants questioned having received training. 70% of all occupants stated they would begin evacuating their building within 2.5 minutes of hearing the fire alarm. However, 20% of occupants stated they rarely responded to fire alarms. Only about 50% of occupants stated that management took the breaking of fire safety rules seriously.

Furthermore, the interviews with senior management revealed that there was no written fire safety policy - other than fixed fire signs located next to fire extinguishers – or any formal organisational structure. The assumption among managers was that the facilities manager would deal with all fire-related issues.

The interviews also showed that planning for fire safety was largely reactive. The only formalised procedures consisted of pre-announced fire drills and quarterly testing of the automatic fire detection and emergency lighting systems by an outside contractor. Fire safety monitoring and reviewing was largely absent in any formal sense.

By following the methodology, the authors were able to gather valuable data on fire safety issues within the organisation. In this way, a more effective set of fire safety procedures has been developed for this organisation. The methodology also highlighted differences in fire safety among buildings and among different sections of the organisation. A further use of this technique has been to establish the fire safety 'status' of the organisation. In this way, progress can be monitored as new fire safety procedures are being implemented.

The authors note that a disadvantage of the methodology was the additional costs and time taken to complete a fire risk assessment. However, the advantage is that greater knowledge as to the efficiency and adequacy of the existing fire safety management system is generated ❑

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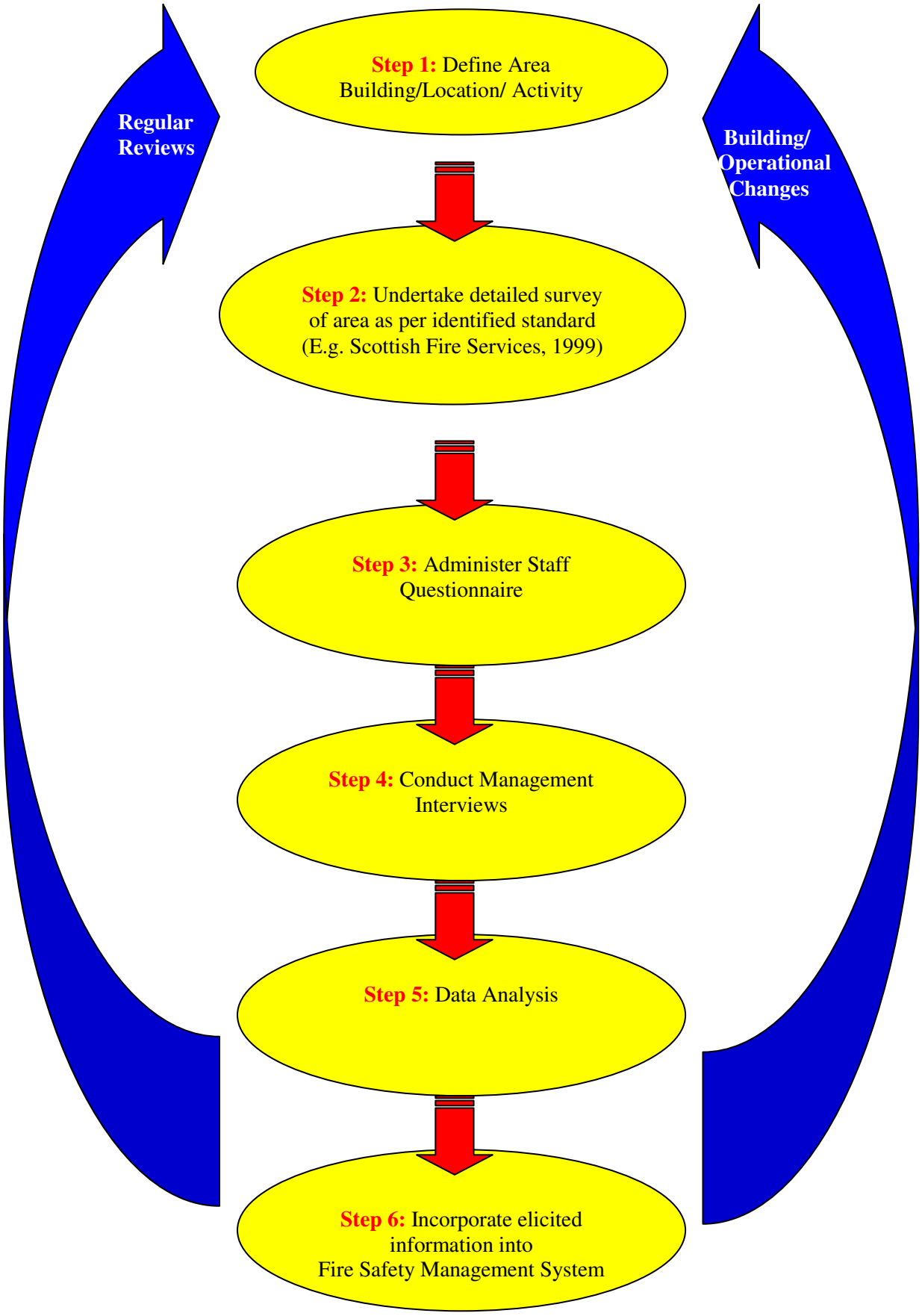
Figure 1: Fire risk assessment tool