BIM: Steppingstone in Disaster Management

A Building Information Model (BIM) is a digital representation of a building. Such a model acts as a shared database for constructor, owner and operator to aid in managing a building construction and its facilities throughout its entire lifecycle. The geometric and semantic entities of the database describes elements such as walls, slabs, stairs, windows and doors; their materials and relationships between them. In addition to geometric/topological and semantic information, BIMs also provide highly accurate and detailed data about the current state of building elements. BIMs have won much attention recently; their use in the architecture/engineering/construction (AEC) industry is rapidly increasing.

Disaster management in urban areas suffers from lack of accurate and real-time information, barriers to sharing of information, and insufficient collaboration. Building Information Modelling is seen as a promising enabler of information interoperability in the built environment, and several areas of disaster management will in the near future benefit from BIM. Emergency and Fire Response is the most demanding area of activity in the Disaster Management Cycle, and is one field that may be thus facilitated.

In the era of blueprints and 2D CAD , the chance of getting accurate and up-to-date building information was limited; the information acquired was not at the required level of detail and was often out of date (blueprints become particularly quickly outdated). These shortcomings are well known to fire-brigades, which therefore make advance studies of public buildings in a possible area of operation. BIMs will change this situation. The 3D indoor geometry and possible exits stored in a BIM, when made available prior to entering the building, will facilitate response personnel in better orientating themselves within and through a building. Information on use of rooms, for example, whether they contain flammable chemicals, and on building materials, such as whether floors get slippery when wet, will enable safer indoor navigation and evacuation. What is more, a BIM may provide information in advance on the functional state of doors, escalators and so on, without the need to contact the facility manager.

BIMs also have potential in facilitating post-disaster damage assessment. For example, in the case of flood, semantic information stored in BIMs will help in answering questions concerning which elements of electrical wiring have suffered damage, or which walls or wall covering needs replacing. These are just a few instances of the opportunities offered by BIMs in disaster management. Their use will provide a steppingstone towards developing various intelligent software applications for disaster management.