

Analyzing and understanding the flood risk to buildings using virtual reality simulation



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Introduction

Traditionally risk management is associated with identification, evaluation and prioritization of risks. Nonetheless, communication of the risks to the parties involved is of the utmost importance. By providing more complete and easy to perceive information regarding potential hazard impacts and economic losses, risk analysis output increases risk awareness and helps make risk-informed decisions. At present, the presence of 3D and Virtual Reality (VR) technologies in risk analysis is extremely scarce.

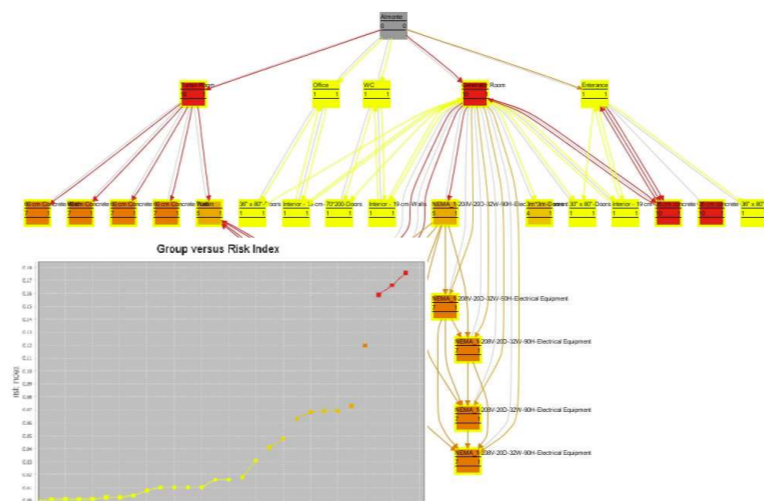
Advantages of using virtual 3D environment

- Emulation of physical space and spatial relationships between elements of the system
- Time-dependent simulations of hazard propagation
- Awareness of physical dimensions of elements and their interconnection.

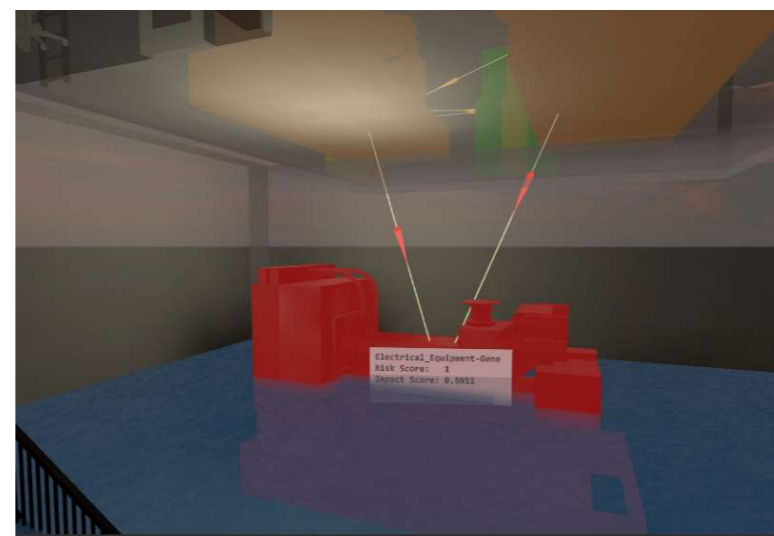


Risk communication comparison

In the example of Almonte HPP's electrical equipment

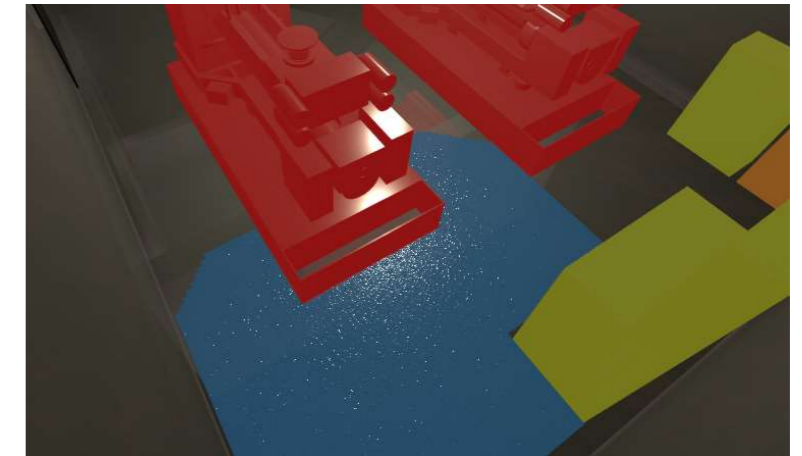


Traditional risk visualization



Interactive 3D risk visualization

Building's flood



Goals of 3D flood simulation development:

- Collision detection and object response
- Water volume control
- Propagation in three dimensions
- Visual risk communication using VR technology

Conclusions

The results show that VR-based risk assessments do offer an excellent alternative to network, graph or similar traditional approaches to risk communication.

Future work

Extensive user testing is expected in the near future to evaluate different aspects of the model and report conclusively they value for risk communication.