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Major Earthquakes and The Renovation and Expansion of the Royal BC Museum

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Introduction

The Royal British Columbia Museum, in Victoria BC, could face considerable consequences in the event of any severe seismic activity due to its proximal location above the Devil's Mountain Fault. Drawing on recent and historical earthquake data, the research investigated a collection of information on the nature of museums experiencing damage due to seismic disasters. The results of these findings were applied towards the current difficulties facing the renovation and expansion of the Royal BC Museum; exploring what kinds of emergency planning measures can be put in place to help save lives and prevent the destruction of BC's history and cultural heritage.

Background

In December of 2012, The RBC Museum, in downtown Victoria BC, announced they would be expanding the museum to include two new 12 and 14 story towers on a part of the 2.7-hectare museum property. In June of 2015, Natural Resources Canada released an official study detailing a previously unknown fault line, Devil's Mountain Fault, in the bedrock below the Strait of Juan de Fuca, running straight through the city of Victoria. This fault is capable of producing potentially devastating shallow thrust earthquakes. In light of this recent earthquake data, how can museum staff, designers and planners utilize research from other areas that suffer similar types of seismic activity, in order to plan for, prepare, mitigate and respond to this threat as they move forward to build the new towers? The research examined some of the projected effects from the eruption of the Devil's Mountain Fault, and examined planning, preparation and mitigation measures that can be utilized in order to save lives and prevent the destruction of BC's history if an earthquake should occur.

Methods

Research into this paper utilized secondary sources in order to provide insight towards earthquakes and museums, and listed sources such as thesis papers, documents, reports, policies, so as to analyze and support the problem statement and conclusion.

Results/Findings

The research shows that an assessment of the seismic stability of the future RBC Museum towers is required and that the type of seismic ground motion at a building site will depend on a number of factors, including: (a) distance from the rupture zone, (b) magnitude and depth of the earthquake, and (c) the soil conditions of the building site (SEABC, 2017). The majority of the literature reviewed maintained that to maximize effectiveness, museum workers must have a general knowledge of how given types of objects, assemblages of objects and exhibition furnishings and fixtures, as well as collections held in storage will respond to earthquake forces (Erturk, 2012). Perhaps one of the key findings from the research was a consensus that museum curators and specialists should receive some formal emergency management training that allows them to utilize their specific knowledge and expertise in areas that can help plan for and prevent exhibit damage, as well as response, recovery and removal of artifacts in conjunction with official emergency management response teams, after a major event (Hunter, 2017). These observations benefit RBC Museum staff and planners by demonstrating how leading staff being equipped with some level of emergency management training could not only assist with planning, prevention and mitigation efforts for the new towers, but also provide additional resources that understand the processes of working with emergency response teams when it comes to re-entering the museum after a major earthquake and salvaging artifacts.

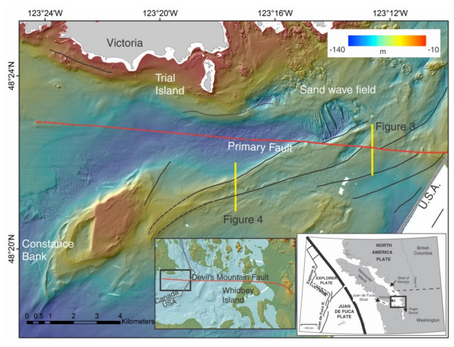

Image: Government of Canada

Discussion

The prevalent themes throughout the research focused on awareness, planning and training. By identifying a major earthquake as a threat to the new museum towers, RBC Museum staff, designers and planners will need to determine the level of risk they are willing to accept when it comes to display and storage of collections. Podany (2009) suggests that when museums are determining the degree of risk, they should apply a simple formula of: Acceptable Risk equals Tolerable Loss; which means that, the less risk the museum wants to take, the more the plan has to take into account the rare occurrence of a major seismic event, such as the eruption of the Devil's Mountain Fault. While planning for a large devastating event means more effort for museum staff, the higher level of mitigation effort helps ensure that the museum collections are at less risk of damage over a longer period of time, and are protected from large scale events and more common occurrences too (Podany, 2009). The literature also showed that advanced techniques for earthquake resistance, such as Base Isolation and Energy Dissipation devices can be built into buildings with a goal of reducing the earthquake-generated forces acting upon it. RBC Museum planners could also adopt a three-prong mitigation plan for the protection of their collections, such as: (1) lowering an object's center of gravity by adding weight, such as placing sand bags inside objects, attaching objects to heavy bases, and adding lead bricks or weights to the inside bottoms of pedestals or cases; (2) restraining objects by firmly securing them to the floor, pedestals, shelves, walls, and/or supporting mounts, and (3) use of base isolation methods. Additionally, the use of digitization technologies to help record, save and protect collections and archives is highly recommended, and offers the possibilities of secondary revenues from researchers. All of this being made more effective through some levels of emergency management training for museum curators and staff.

Conclusions or Recommendations

The final recommended application from this research is that RBC Museum staff, designers and planners need to review and understand the threat posed by Devil's Mountain Fault and how shallow thrust earthquakes could impact building designs and exhibit displays, and how to reduce these risks through proper planning and mitigation measures that take into account new technologies such as Base Isolation and Energy Dissipation devices. Additionally, the museum should ensure that museum curators and specialists should receive some formal emergency management training that allows them to utilize their specific knowledge and expertise in areas that can help plan for and prevent exhibit damage, as well as response, recovery and removal of artifacts in conjunction with official emergency management response teams, after a major event.

References

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Image: Government of British Columbia