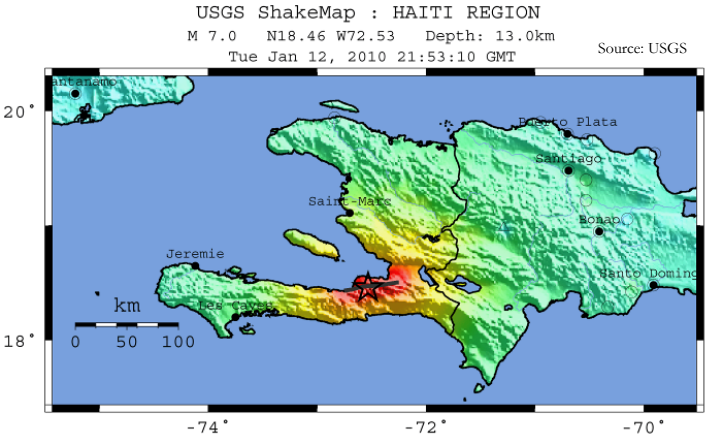
MRP ENGINEERING IN HAITI AFTER THE 2010 M7.0 EARTHQUAKE

On January 12, 2010, a devastating M7.0 earthquake struck near Port-au-Prince, Haiti. The earthquake was the result of strike-slip motion along the Enriquillo-Plantain Garden fault system, which is near the boundary of the Caribbean and North American plates. Over 50 aftershocks of magnitude 4.5 or greater followed the main event, with a M5.8 aftershock occurring on January 20, 2010. According to current estimates, there were over 150,000 casualties and over one million made homeless.



Mark Pierepiekarz, PE, SE, President of MRP Engineering, LLC, was called to Haiti just days after the quake hit to help evaluate the structural damage to buildings and infrastructure. Traditionally, Haitian buildings are built using lightly reinforced concrete frames, infilled with unreinforced concrete block (CMU) walls. The lateral resistance is primarily provided by the relatively weak unreinforced CMU walls. Failures can occur due to irregular building geometry, lack of sufficient strength, unstable foundations, or sloping site.

In the days following the initial quake, most residents remained fearful of aftershocks and the stability of the remaining buildings. Survivors set up camps in any available open space, even if their homes survived. As Mr. Pierepiekarz toured the Port-au-Prince region, he visited private homes, a school, and other facilities, providing technical support to those affected by the event. Although much of the damage was catastrophic, many buildings survived the effects of the earthquake with repairable damage. Mr. Pierepiekarz saw immediate need for damage assessments, practical repair techniques, and building retrofits that could be employed for the surviving structures in a country with already limited resources stretched even further by this disaster.

Canapé Vert Neighborhood

Poorly constructed houses were destroyed by strong ground shaking and slope failures.

Survivor Camps

Fearing aftershocks, most of the residents camp on any available open space, even if their homes survived.

Since Haiti generally lacks the resources and expertise to assess the damage and institute the necessary repairs, skilled structural engineers and contractors from abroad are needed to provide technical and construction expertise, as well as training to rebuild a better future for Haiti.

Haitian National Palace

The two-story structure, built between 1914 and 1921, partially collapsed during the event.

Port-au-Prince Cathedral

The roof and the towers flanking the main entrance collapsed. The lower parts of the walls remain standing. Nunciature and archdiocese offices also collapsed.

Hospital, Santo (north of airport)

This newly constructed two-story hospital was nearly ready for occupancy when the earthquake struck. The reinforced concrete frame structure experienced collapse at the second level.

Hai Tel Switch Building, Canapé Vert

The overall mobile telephone network survived but was strained by the phone call volume. This office and switch building suffered major structural damage. The switch equipment reportedly continued to function.

Oasis Complex, Pétion-ville

The commercial complex was under construction when the earthquake occurred. The reinforced concrete shear wall (left side of photo) exemplifies modern earthquake-resistant construction that is needed in Haiti.

Port-au-Prince (airport area)

Collapsed masonry façade at a commercial complex near the U.S. Embassy. Light steel-framed steel section in the background survived the earthquake.

MRP ENGINEERING SERVICES

MRP Engineering is a structural engineering and risk analysis firm (based in metropolitan Seattle, WA) which provides services involving pro-active risk analysis for natural hazards, damage investigation, and upgrade design. We help clients protect their business operations from risks to physical assets resulting from the adverse impacts of earthquakes, hurricanes, and other hazards. Our philosophy is to listen to your needs and then provide you with practical and cost-effective structural engineering-based risk reduction solutions.

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