



FAULT HAZARD INVESTIGATION OF THE MOTAGUA FAULT

for a Proposed Liquefied Natural Gas Terminal Facility in Honduras, Central America

PROJECT DESCRIPTION

Earth Consultants International conducted a study to assess the potential for surface fault rupture at a site on the north coast of Honduras, near the boundary between the Caribbean and North American tectonic plates. The fault study was conducted in accordance with the National Fire Protection Association's Standard for the Production, Storage and Handling of Liquefied Natural Gas (NFPA Standard 59A). The study was conducted in two phases. Phase 1 consisted of literature review and aerial photo and imagery interpretation. The second phase dealt with the emplacement of Cone Penetration Tests (CPTs) to look for offsets in the stratigraphy that could be related to faulting.

SOLUTION

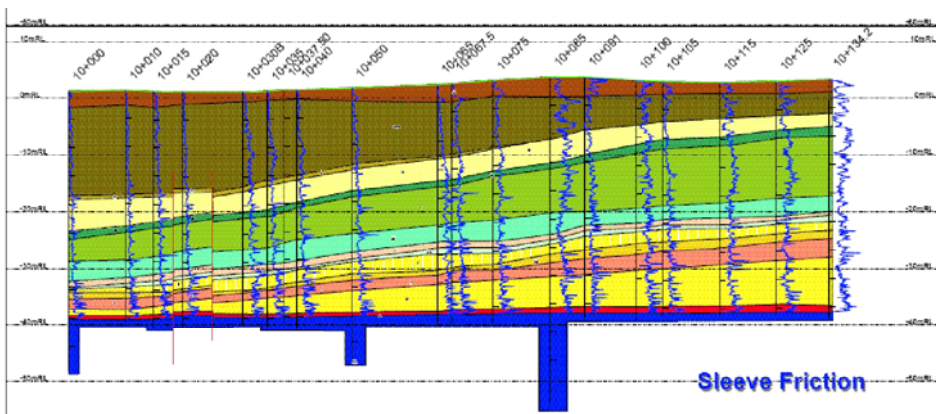
From the Landsat images and Corona aerial photographs of the site vicinity we identified several lineaments in the area, including some very close to the site. The images also showed that the site sits on very young sediments; as a result, we could not preclude the possibility of recently active faults in the shallow subsurface, buried under the young deposits. Unusual landforms suggested the area has experienced recent tectonism (folding and/or faulting), and possibly lateral spreading. For the field portion of the study, we assembled a multinational team of drillers and engineers that emplaced more than 50 CPTs into young, saturated sandy deposits. The CPTs were pushed to a depth of at least 40 meters, and into a distinctive clay layer that we used as a stratigraphic marker to determine whether or not there were vertical offsets in the stratigraphy between two contiguous CPTs. Additional CPTs were emplaced where these breaks were observed to more closely determine the location of the inferred faults. The offsets were traced upward to at least the bottom section of the overlying sand, and some could be extended upward to near the ground surface. Horizontal displacements

were indicated by the variation in the thickness of the beds in the sandy section. From these results we concluded that the site is either 1) underlain by active faults,

2) underlain by a thick section of liquefiable sediments that have experienced several episodes of lateral spreading, or 3) sits on a large shallow-dipping slump that developed as a result of sediment loading of the soft underlying clay. Additional studies to determine the cause of these features were recommended.



The Cone Penetration Tests were advanced into the ground using a track-mounted drill rig modified to accommodate the CPT rods. Digital measurements were recorded by and saved to a field laptop computer. Processing of the CPT data was done in the evenings allowing us to modify our field program as necessary in response to the day's findings.



Cross-section of the site using the sleeve friction records (blue lines) to interpret the subsurface stratigraphy and offsets (vertical red lines). The site is underlain by interbedded sand and silty sand to a depth of about 40 meters. This package sits on clay (blue unit at bottom), a distinctive geologic unit that was used as a stratigraphic marker.

