FEMA 339 / March 1999

Building Performance Assessment Report

Hurricane Georges In Puerto Rico

Observations, Recommendations, and Technical Guidance

IMAGE COURTESY NASA

Federal Emergency Management Agency
Mitigation Directorate
Washington, DC,
Region II, New York, NY
and the Caribbean Area Office

The Building Performance Assessment Process

In response to hurricanes, floods, earthquakes, and other disasters, the Federal Emergency Management Agency (FEMA) often deploys Building Performance Assessment Teams (BPATs) to conduct field investigations at disaster sites. The members of a BPAT include representatives of public and private sector entities who are experts in specific technical fields such as structural and civil engineering, building design and construction, and building code development and enforcement. BPATs inspect disaster-induced damages incurred by residential and commercial buildings and other manmade structures; evaluate local design practices, construction methods and materials, building codes, and building inspection and code enforcement processes; and make recommendations regarding design, construction, and code issues. With the goal of reducing the damage caused by future disasters, the BPAT process is an important part of FEMA's hazard mitigation activities. For more information about the BPAT program or if you are interested in becoming a member, please visit our website at www.fema.gov/mit/bpat.

Throughout Puerto Rico, the BPAT visited communities where people had lost their life's belongings and literally did not have a roof over their heads. The team was struck by the dignity of those individuals who had suffered great losses and appreciated the courtesy and hospitality that was extended to them. The team also appreciated their patience with the BPAT's questions. This report is dedicated to these individuals, their families, and their friends. Their remarkable spirit is summarized by the saying "*al mal tiempo, buena cara*", which translates as "hard times, strong faces".

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List of Acronyms

A-Zone	Special Flood Hazard Areas, excluding V-Zones
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ARPE	Administración de Reglamentos y Permisos (Regulations and Permits Administration)
ASCE 7-95	American Society of Civil Engineers Standard 7-95 *Minimum Design Loads for Buildings and Other Structures*
ASD	Allowable Stress Design
ASOS	Automatic Surface Observing System
ASTM	American Society for Testing and Materials
BFE	Base Flood Elevation
BOCA	Building Officials and Code Administrators
BPAT	Building Performance Assessment Team
CAV	Community Assessment Visit
CIAPR	Colegio de Ingenerios y Agrimensores (College of Engineers and Surveyors)
CMU	Concrete Masonry Unit
EIFS	Exterior Insulating Finishing System
EO12699	Executive Order 12699
EO11988	Executive Order 11988
EPS	Expanded Polystyrene System
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Building Code
ICBO	International Conference of Building Officials
in	inch
LRFD	Load and Resistance Factor Design
mb	millibars
mph	miles per hour
NEHRP	National Earthquake Hazards Reduction Program

NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
psf	pounds per square foot
SBC	Standard Building Code
SBCCI	Southern Building Code Congress International
SFHA	Special Flood Hazard Area
UBC	Uniform Building Code
V-Zone	An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources