

**Status of Building Codes in Jamaica and other English
Speaking Caribbean Countries
with respect to earthquake provisions and enforcement**

By

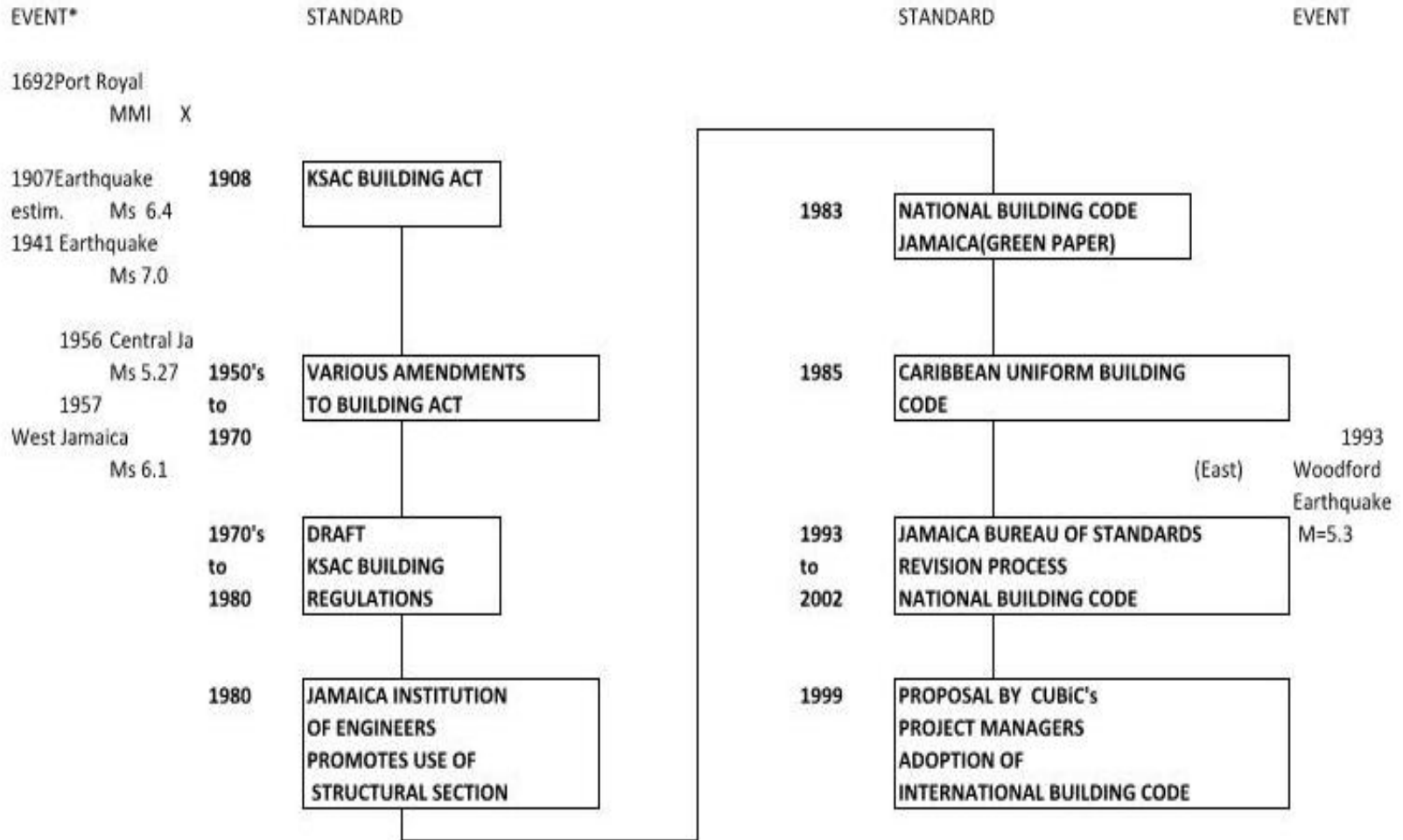
Wayne Adams MJIE, MIStructE, MSc. DIC

Alfrico Adams FJIE, FIStructE

Summary

- The Jamaica National Building Code was updated in 2009 adopting the International Building Code 2003. We discuss the following:-
- A timeline of the historical development of the provisions to the final update is presented
- The steps in administrative process for the recent update are outlined
- Code provisions specific to seismic resistance are highlighted
- A brief overview of other Codes in the Caribbean

Timeline of Building Standards Development in Jamaica



* - After John Periera 1982

The New National Building Codes (Structural)

- Jamaica Application Document JS 306:2009 for International Building Code:2003
- Small Building Code and Jamaica Application Document JS315:2009 for International Residential Code:2003
- Jamaica Application Document JS310:2009 for International Existing Building Code:2003

Steps in administrative process for recent update

- 2001 An initiative by the JIE President is attempted to revive code revisions
 - 2003 BSJ and JIE holds a conference of stakeholders to decide adoption (**ICC International Building Code selected**) based on complete 1990's code revision efforts
 - Sept 2003 A Steering Committee is appointed to plan
 - Adoption process
 - Implementation
 - Organisation
 - Steering Committee decisions
 - i) Code adoption of IBC, IEBC,IFC,IECC,IRC
 - ii) Draft Application documents after an ICC document review
- cont'd

Steps in administrative process for recent update

- Steering Committee decisions cont'd
- iii) Sub-Committees formed for code sections as
 - Administration and Compliance
 - Electrical and Mechanical
 - General Sections
 - Structural Requirements and Material Use
 - Occupancy and Fire Safety
- iv) Steering Committee selects Sub Committee Chairs. Chairs select Sub-Committee members. Chairs also assigns document review and drafting tasks
- v) Establish Secretariat
- vi) Appoint a Consultant

Steps in administrative process for recent update

- 2004 January Agreed Terms of Reference and work
- March Start review
- April Because of cross references between IBC documents 13 of all the 14 documents are adopted.
- 2005 June The timetable for adoption was reset from June 2005 to December 2005. The International Zoning Code (IZC) was omitted because of conflict with the Planning Act

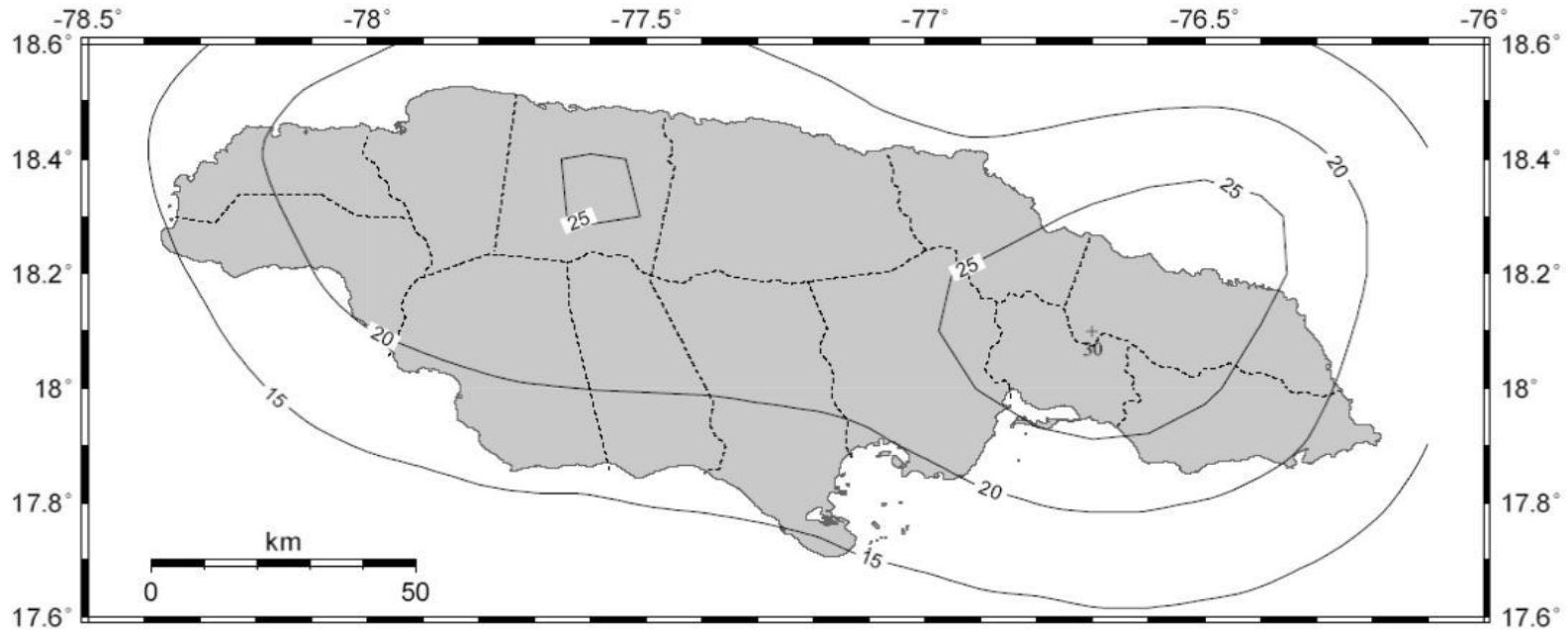
WHAT IS NEEDED NOW

Enactment in Parliament of the New Building Act that includes the Application documents (Guidelines to the International Codes) to make the code legally binding

Select seismic resistant provisions in application documents

- Jamaica specific Seismic Hazard maps are introduced for S_s and S_1 spectral acceleration parameters corresponding to accelerations of 2% probability of exceedance in 50 years in the Application Document for the IBC
- A Small Building Code is added to the Jamaica Application document for the International Residential Code. Some provisions of the T & T Small Building Code are incorporated

Extract of Application Document for IBC

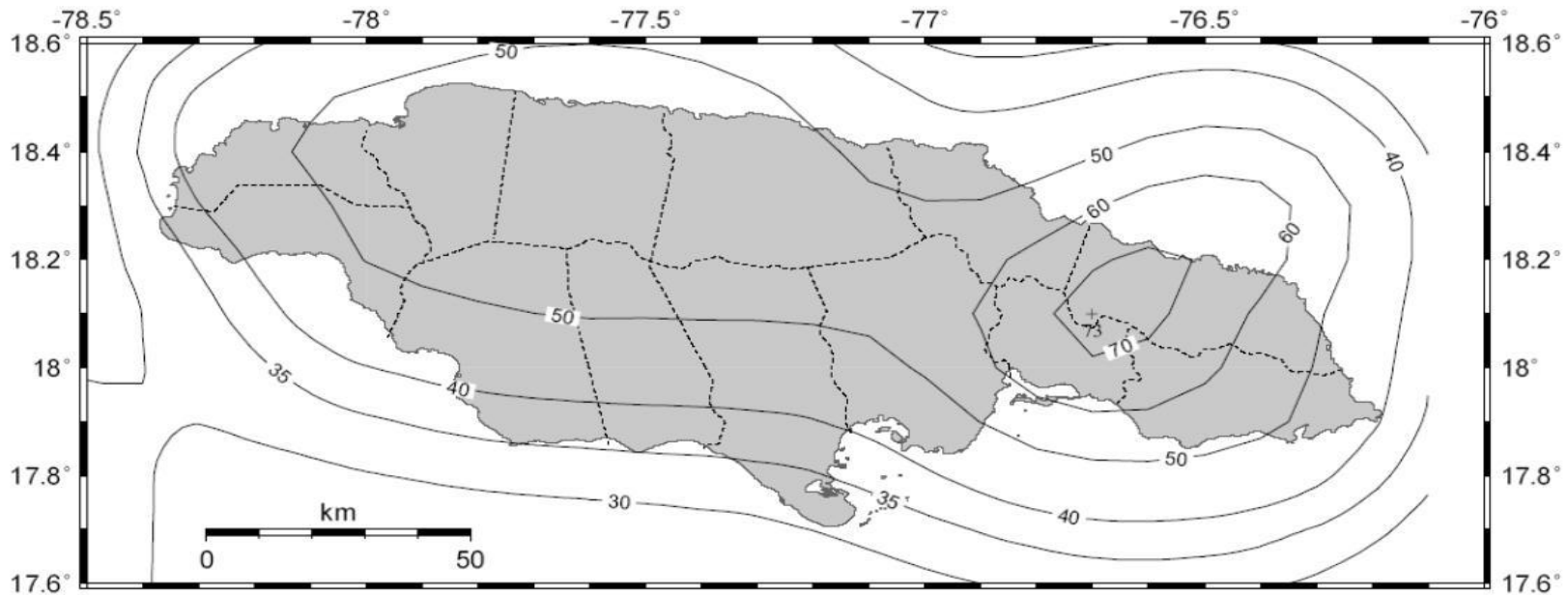


SCALE 1:1250000

FIGURE 1619 (9)

MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR JAMAICA OF 1.0 SEC SPECTRAL
RESPONSE ACCELERATION (5 PERCENT OF CRITICAL DAMPING) SITE CLASS AVERAGE ROCK

Extract from Application Document for IBC



SCALE 1:1250000

FIGURE 1619 (9)

MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR JAMAICA OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5 PERCENT OF CRITICAL DAMPING) SITE CLASS AVERAGE ROCK

Status of Codes in some Caribbean territories

Status			
Country	Standards	Laws	Enforcement
Anguilla	Y	Y	Y
Antigua	Y	Y	Y ?
Bahamas	Y	Y	Y
Barbados	Y	N	N
Belize	Y	N	N
BVI	Y	Y	Y ?
Cayman	Y	Y	Y
Dominica	Y	Y ?	N
Grenada	Y	Y	Y ?
Guyana	N	N	N
Jamaica	N	Y	Y
Montserrat	Y	Y	Y
St Kitts	Y	Y	Y ?
St Lucia	Y	N	N
St Vincent	N	N	N
TCI	Y	Y	Y
Trinidad	N	Y	Y

Table courtesy pre-2005 of Eng. Tony Gibbs, FIStructE

A discussion highlighting the status of CUBiC in the Caribbean

QUESTIONS REGARDING SEISMIC RESISTANT ASPECTS OF BUILDING CODES

IN ENGLISH SPEAKING CARIBBEAN TERRITORIES

What is the Building Code(s) used in the territory? – **In most Commonwealth Caribbean countries the “official” standard is CUBiC Part-2 Section-3 Earthquake load.**

Is this code legally mandated by the local authorities? – **Only in a minority of Commonwealth Caribbean countries.**

When was the last code revision including seismic provisions? – **1985**

Does it cross reference an internationally recognised standard for seismic resistant design.eg.CUBiC,IBC? – **It is CUBiC.**

Are the seismic resistant provisions of other codes permissible? – **Yes**

What is the local code based seismicity designated in the code? ie. Maximum Credible Earthquake,S1 and Ss,Z etc. – **Z factors**

Is there separate provisions in the code for the seismic resistance of small buildings that may be more prescriptive for indigenous construction? – **No.**

Does the building code address the seismic resistance of existing buildings built prior to the code’s adoption? – **No.**

Is there separate provisions in the code for the seismic resistance of small buildings that may be more prescriptive for indigenous construction? – **No.**

Does the building code address the seismic resistance of existing buildings built prior to the code's adoption? – **No.**

Is the territory using metric, imperial or dual units? – **Both metric and imperial**

Any additional comments that you think is relevant to describing the territories?[territory's seismic design methods?] – **The real situation is that those engineers (a minority) who take earthquake-resistant design seriously do not use CUBIC. They use more recent standards based on NEHRP and ASCE 7 provisions. The majority of engineers do not use any earthquake-resistant design standard in a deliberate, consistent and "correct" manner.**

What was the territory's largest event and when did it occur? – **The largest instrumentally-recorded earthquake in the Caribbean was the 8.1 magnitude event in the Dominican Republic in 1946. The 1843 event near Guadeloupe was estimated to be of similar magnitude ($M = 8.0$). On 19 March 1953 an earthquake ($M_s = 7.5$) occurred close to St Lucia. It caused damage in Barbados.**

Code peak rock acceleration 10% prob. of exc. in 50years

Hazard	Earthquakes Accelerations	Earthquake Resistance Requirements
Country		
Anguilla	0.3g	Anguilla building Code
Antigua & Barbuda	0.3g	Antigua Building Code
Aruba	M. No	
Bahamas	0.2g	Bahamas Building Code
Barbados	0.2g	Barbados Building Code
British Virgin Islands	0.3g	
Cuba		
Dominica	0.3g	OECS Bulding code
Dominican Republic		
Guadeloupe	0.35g (cl.B) 0.40g (cl.C) 0.45g (cl.D)	PS 92
Grenada	0.2g	OECS Building Code
Haiti	0.3g	
Jamaica	0.3g	Jamaica Building Code
Martinique	0.35g (cl.B) 0.40g (cl.C) 0.45g (cl.D)	PS 92
Montserrat	0.3g	
Netherlands Antilles	0.3g	
Saint Kitts & Nevis	0.3g	St.Kitts Building Code
Saint Lucia	0.3g	OECS Building Code
Saint Vincent & the Grenadines	0.3g	Draft Building Code
Trinidad & Tobago	0.3g	Draft Small Building Code

Extract from Consensus Conference on Technical Building Standard in the Caribbean (CCTBS) position paper by Myron Chin Ph.D FStructE -date of updating 2004

REMINDER OF PRIORITIES

- 1. EVALUATE EXISTING BUILDINGS, ESPECIALLY ESSENTIAL FACILITIES.
- 2. RETROFIT WHERE NECESSARY, WITH ESSENTIAL FACILITIES AS THE FIRST PRIORITY.
- 3. ENSURE ENFORCEMENT FOR BOTH DESIGN AND CONSTRUCTION.

CHANGES IN DESIGN METHODS OVER THE YEARS

- BOTH SEAOC AND UBC, THE MOST POPULAR USA BASED CODES, HAVE EXPERIENCED FREQUENT CHANGES IN DESIGN METHODS OVER THE LAST 50 YEARS.
- THE RESULT IS THAT THE ACTUAL FORCES USED IN NEW BUILDING DESIGNS WOULD HAVE VARIED ACCORDINGLY IN SUCCESSIVE DECADES.
- SOME CODES e.g. ASCE 31-03 PRESCRIBE A “BENCHMARK BUILDING”, i.e. A CODE EDITION, e.g. IBC 2000, BEYOND WHICH CHECKS ARE WAIVED.

1.EVALUATE EXISTING BUILDINGS

- THE IDEAL ACTION WOULD BE TO EVALUATE ALL EXISTING BUILDINGS , BUT THIS IS NOT ON.
- STATIN REPORTS THAT IN 2006 THERE WERE 750,000 DWELLINGS IN JAMAICA. CENSUS 2001 SHOWS 70% OF HOUSES AS CONCRETE OR BRICK. THIS DOES NOT INCLUDE NON-RESIDENTIAL BUILDINGS.
- THE COST OF REVIEWING ALL EXISTING BUILDINGS WOULD BE PROHIBITIVE.

EXISTING BUILDINGS CONT'D.

- PRIORITY NEEDS TO BE GIVEN TO ESSENTIAL POST-EARTHQUAKE FACILITIES.
- NEXT ORDER OF PRIORITY SHOULD BE BUILDINGS HOUSING LARGE NUMBERS OF PERSONS AND SELECTED EMERGENCY SHELTERS.
- EXISTING BUILDINGS MAY BE EVALUATED USING Ch.A5 of JS310 and IEBC.(See also ASCE 31-03)

1. Contd.-ESSENTIAL BUILDINGS

- FOR EXISTING ESSENTIAL FACILITIES THE MAJOR DIFFICULTY IS MUSTERING THE NATIONAL WILL TO TAKE ACTION,
- IT IS INTERESTING TO REVIEW THE ACTIONS TAKEN IN CALIFORNIA IN RESPONSE TO THEIR AWAKENED SENSE OF VULNERABILITY