



Construction Quality Assurance (CQA) Mechanism in Grenada

Jean Marc Racine

Organization of American States

Department of Sustainable Development

Montego Bay, Jamaica

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Outline...

- Housing Situation in Post-Ivan Grenada...
- Construction Quality Assurance (CQA) in Pre-Ivan Grenada;
- Proposed Post-Ivan Construction Quality Assurance (CQA) Mechanism;
- Way Forward...

Post-Ivan Grenada ...

Housing Situation

Housing in Grenada after Sept 7, 2004* :

- 90 % of the stock damaged.

Of which :

- 30 % needed complete replacement;
- 20 % complete roof loss + Damage walls;
- 20 % complete roof loss;
- 20 % significant loss of roof covering

**UNDP 2004.*



Credit : www.maimi.com/ Sept 2004.

Post-Ivan Grenada ...

Estimate of Home Repair Market in Grenada*

Size (sq. ft.)	% of total	Number	Avg. repair cost (US\$)	Total repair cost (US\$M)
500 to 1000	55	16,500	10,000	165,0
>1000 to 1500	18	5,400	18,000	97.2
>1500 to 2000	12	3,600	30,000	108,0
>2000	15	4,500	50,000	225,0
Total	100	30,000		595.2
Total >1500	27	8,100		333,0

Table I: Estimate of Home Repair Market in Grenada – source *UNDP 2004.

Challenges for Home Reconstruction

Main Issue :

- Balancing need of having roof over heads (now !!!), and desire to build back Hurricane Resilient homes !

Building Hurricane Resilient homes implies :

- Access to affordable credits for owners with damaged homes;
- Access to design and construction advisory services ... ensuring resiliency to hurricane forces;
- Existence of a property insurance system supporting damages that **cannot** be completely prevented from construction standards.

The Grenada Hurricane Resilient Home Reconstruction Program G-(HR)²

Main Components :

1. A Home Reconstruction Lending Operation
 - Administered by local commercial banks – with partial credit risk guaranteed to be provided by the International Finance Corporation of the World Bank (IFC);
2. A Sustainable Construction Quality Assurance (CQA)
 - Extensive Training for local engineers , builders and craftsmen; Capacity building of agencies/institutions involved , e.g. Grenada Physical Planning Unit (PPU).

The Grenada Hurricane Resilient Home Reconstruction Program G-(HR)² ... cont'd

2. CQA.. Cont'd

- Participation from the mortgage companies- through requiring CQA certification;

3. A property Insurance Component

- Getting Major property insurers to agree on underwriting properties constructed through the CQA at favorable rates; hence,
- Recognizing the attention given to hurricane resiliency in home design and construction;

Home Design and Construction Quality Assurance Systems (CQAS)

Required Characteristics of a CQAS :

- Compatible with/and overcoming any shortcomings of the existing building review system;
- Cost-effectiveness in implementation;
- Attractive to home-owners and Developers;
- Meets requirements of lenders and insurance companies;
- **Sustainable** – goes beyond the project's timeframe !

Construction Quality Assurance (CQA) System in Pre-Ivan Grenada

1. Objectives :

- Assessing and analyzing the existing Construction Quality Assurance System in Pre-Ivan Grenada;
- Identifying shortcomings of the Existing CQA... designing a Sustainable and Effective Quality Assurance System

Construction Quality Assurance (CQA) System in pre-Ivan Grenada... cont'd

2. Methodology :

- Survey of Construction Design Applications*
 - 17 Construction design Application approved by PPU :15 residential - 2 commercials;
 - All applications submitted between 2001 and 2005, and randomly selected from a total of 1748;

- Review PPU's on-site construction Control procedures.

*OAS/FEMCIDI - Consulting Engineering Partnership (CEP) Ltd., 2005

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

A. Existing PPU Construction Quality Assurance System

1. Processing Construction Permits Applications

- Grenada National Building Code and guidelines contain appropriate building design and construction standards
- All residential applications are checked for compliance with Grenada Building Standards;
- Structural Engineer designs' compliance outsourced to a private engineering company;
- Most applications reported approved... either first or on submitting of additional information

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

2. Conducting on-site Inspections

- On-site inspections carried out by only 6 PPU inspectors;
- Only 20 % of the houses receiving construction permits are inspected during plan execution (e.g. 80 of 390 for 2004);
- A final site inspection not always required for Certificate of Occupancy permit approval;

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

B. Resources, Institutions, Groups Involved :

1. Governmental Agencies :

- PPU checks planning concerns, based on the Physical Planning & Development Control (PPDC) Act/ GBG : Zoning and setback distances
- Ministry of Public Health : sanitary waste disposal
- Ministry of Public Works : drainage
- Structural Engineering Firms: Structural design check outsourced to a private Structural Engineering firm – paid directly by Ministry of Finance
- Agency for Reconstruction and Development (ARD) – Reconstruction coordination in post-Ivan Context.

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

B. Resources and Institutions involved... cont'd

2. Mortgage Agencies (MA) :

- Submission of an approved PPU application first condition;
- Perform valuations at varied construction stages for disbursement approval;
- Valuations performed by a Quantity Surveyor (QS) provided by MA to the Dev/homeowners;
- Valuation focuses on Quantity **not** Quality.
- Quantity surveyors are paid directly by Homeowners for a total of 4 to 6 visits @ EC \$ 300 to EC\$ 600.

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

Mortgage Agencies (MA) cont'd :

- Houses are often over-evaluated as Quantity Surveyor not able to evaluate the Quality of construction !!

3. Insurance Agencies (IA) :

- Only 30% of insurable properties insured (Sept 05);
- Underinsurance rate estimated to 40% (Sept 05);
- Do not perform design check;
- Generally assume accuracy of information submitted by homeowners;
- Do not conduct site visits – unless site location declared in a vulnerable area by homeowners : coastline, e.g.

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

4. Construction Professionals – Specials Groups.

- Professional Engineers, and Engineering Firms;
- Structural Engineering Firms;
- Architects / Planners;
- Credit Unions lending important- CQA procedures not well know.
- Contractors : construction design execution and management
- Community-Based Construction Groups : friends, neighbors, families- “ Konbit”

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

C. Survey Findings and Analysis

1. PPU approved applications... :

Review for structural deficiencies of 15 residential development- and 2 Commercial approved applications revealed :

- No cover to the reinforcement in contact of the ground
- Inadequate reinforcement lap lengths
- Concrete in columns not being compacted
- Absence of Mortar between adjoining concrete blocks
- Incorrect placement of wall reinforcement

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

Description of Deficiency	Frequency Of Occurrence	Applicable Applications	Percentage of frequency occurrence
1. Inadequate stair reinforcement	16	17	94%
2. Missing roof connection details	15	17	88%
3. Missing roof metal sheeting thickness	14	17	82%
4. Missing beam to wall connections	13	17	76%
5. Inadequate or missing concrete cover	13	17	76%
6. Inadequate purling spacing	9	17	53%
7. Inadequate rafter to ridge board connections	9	17	53%
8. Inadequate suspended reinforced concrete floor thickness	8	13	62%
9. Inadequate thickness of external walls	7	17	41%
10. Inadequate suspended reinforced concrete beam depths	6	13	46%

Table II: PPU Approved application Survey Findings - OAS 2005

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

	Description of Deficiency	Frequency of Occurrence	Applicable Applications	Percentage of frequency occurrence
11.	Inadequate thickness of internal walls	3	17	18%
12.	Missing wall bracing	1	17	6%
13.	Bottom steel reinforcement laps at mid-span of suspended beams	1	17	6%
14.	Missing column reinforcement	1	17	6%
15.	Conflicting beam information.	1	17	6%
16.	Retaining wall reinforcement on wrong side of the wall	1	1	100%
17.	Inadequate cantilever reinforcement anchorage	1	1	100%

Table II-1: PPU Approved application Survey Findings - OAS 2005

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

2. Scoring of Existing Construction Quality Insurance

Effectiveness of the Existing QA System in Disaster Vulnerability Reduction and Energy Conservation	Not effective	Minimally effective	Moderately effective	Adequately effective
Effectiveness Score	0	1	2	3

Entity	Structural Vulnerability	Energy Wastage	Comments
Draftsman	1	1	Mainly checks geometry.
Contractor	1	1	Mainly checks geometry and materials.
Homeowner	1	1	Mainly checks geometry.
Architect	1	2	Mainly checks geometry and finishes.
Structural Engineer	2	2	Mainly checks geometry and structure.
Physical Planning Unit	2	1	Mainly checks geometry and structure.
Mortgage agency	2	1	Relies on an approved planning application.
Insurance agency	0	0	Does not check designs.

Table II-2: PPU Approved application Survey Findings - OAS 2005

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

Effectiveness of the Existing QA System in Disaster Vulnerability Reduction and Energy Conservation	Not effective	Minimally effective	Moderately effective	Adequately effective
Effectiveness Score	0	1	2	3

Entity	Structural Vulnerability	Energy Wastage	Comment
Draftsman	0	0	Does not perform site inspections.
Contractor	2	2	Mainly checks geometry.
Homeowner	1	1	Mainly checks geometry.
Architect	1	2	Mainly checks geometry and finishes.
Engineer	3	2	Mainly checks geometry and structure.
Physical Planning Unit	1	1	For the 20% of houses that are checked.
Mortgage agency	0	0	Checks cost only.
Insurance agency	0	0	Does not check.

Table II-3: PPU Approved application Survey Findings - OAS 2005

Construction Quality Assurance (CQA) System in pre-Ivan Grenada ... cont'd

D. Findings Summary

- Appropriate Building Standards Exist- GBG published since 1999;
- Effective construction Application review lacking;
- Construction control Enforcement Mechanism lacking;
- Houses are often over-evaluated as Quantity Surveyor not able to evaluate the **Quality** of construction;

E. Conclusion:

Considering that approval + enforcement are PPU's role, shortcomings are therefore mainly due to :

- Inadequate Physical Planning Unit design Check;
- Inadequate Physical Planning Unit Construction Check

Proposed Construction Quality Assurance (CQA) Mechanism for Grenada

A- Main Requirements :

- **Clear Land Titling** : Homeowner has title to land and/or permission from landowner to build ;
- **Capacity Building** for Governmental Agencies;
- **Commitments** of the Mortgage & Insurance Agencies;
- **Legal Framework and Accountability** mechanisms for Professional Builders (Contractors, Engineers/ Architects);
- **Certification Mechanisms** for all Professional Builders ;
- **Loans guaranteed Coverage**;

Proposed Construction Quality Assurance (CQA) Mechanism for Grenada... cont'd

B. Main Components/Stages

1. Design Stage
2. Financing Stage
3. Construction Stage
4. Insurance Stage

Proposed Construction Quality Assurance (CQA) Mechanism for Grenada... cont'd

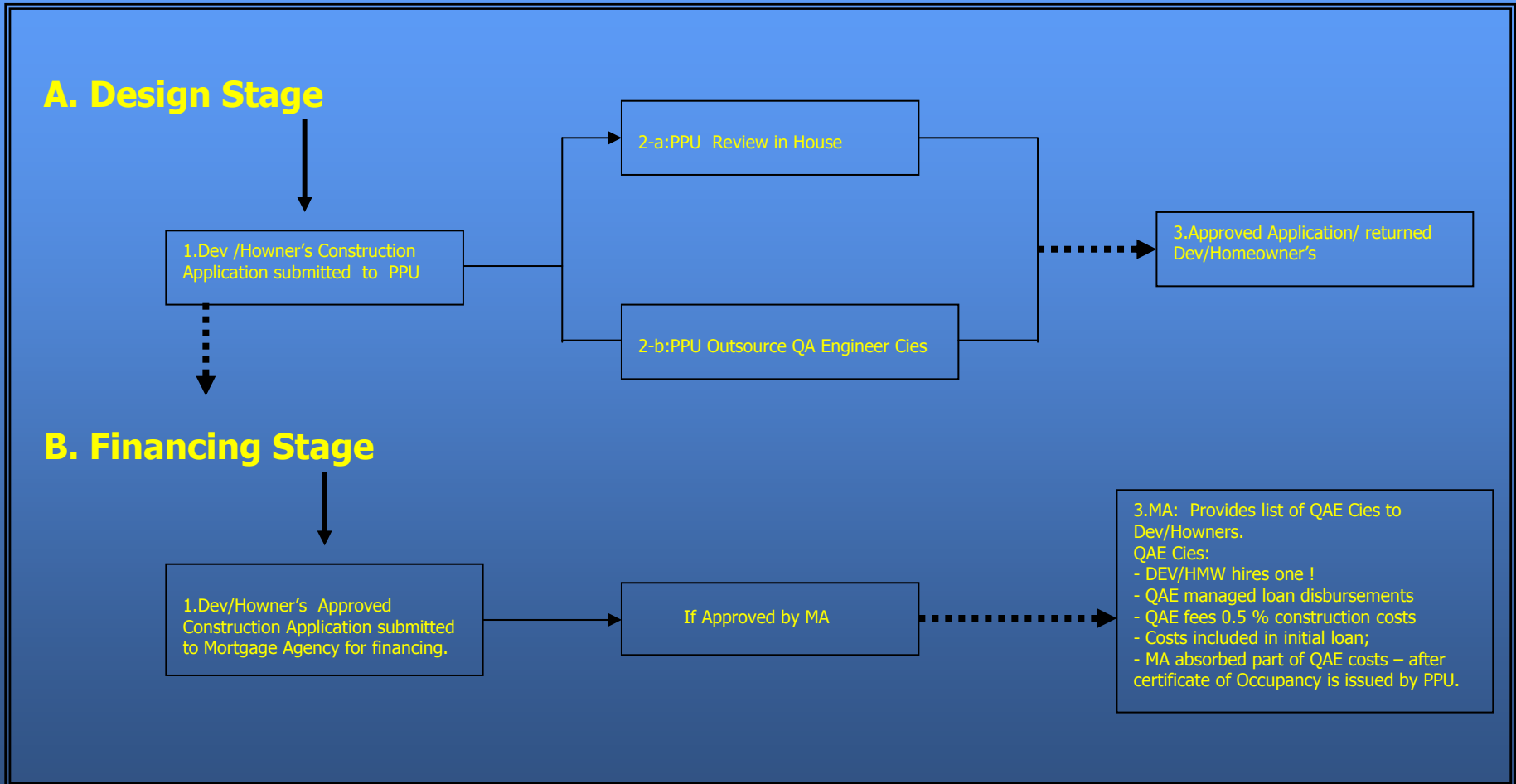


Figure I- Managing Construction Design Review –Approval and Financing - OAS, May 2005

Proposed Construction Quality Assurance (CQA) Mechanism for Grenada ... cont'd

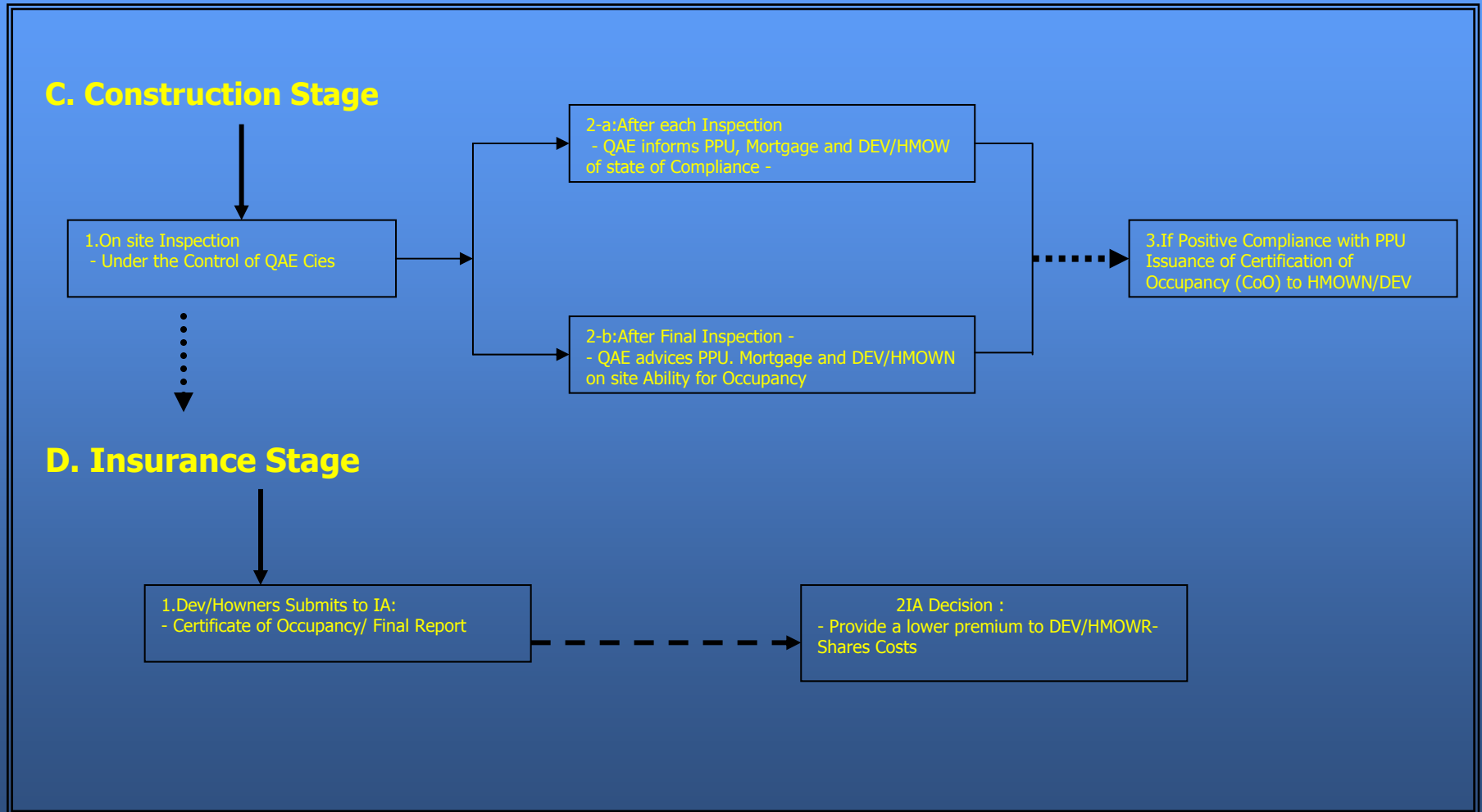


Figure II- Managing Construction Execution and Insurance Financing - OAS, May 2005

Proposed Construction Quality Assurance (CQA) Mechanism for Grenada... cont'd

Way Forward....

- ✓ Continue in Country Stakeholders Consultation;
- ✓ Stakeholders Commitments;
- ✓ IFC – Home Reconstruction Lending Procedures to finalize;
- ✓ Implementation to Start in Sept 2006 (Trainings, Courses, and Symposium) with support from the Canadian International Development Agency (CIDA).
- ✓ Regionalization.

Contact Information

Grenada Hurricane Resilient Home Reconstruction Program

Organization of American States (OAS)

Department of Sustainable Development (DSD)

www.oas.org/dsd/

Jean Marc Racine

Natural Hazards & GIS Specialist.-

Department of Sustainable Development.-

Organization of American States.-

1889 F St. NW - Washington DC 20006

tél : 202-458-3228 - fax : 202-458-3560

jracine@oas.org

Thank YOU !!!