HAÏTI

PROGRAMME DE PRÉPARATIONS DE RÉPONSES AUX TREMBLEMENTS DE TERRE ET CYCLONES EN HAITI

REFERENCE MANUAL

2019

Port-au-Prince, Haiti

USAID DU PEUPLE AMERICAIN

miyamoto.

Terms of use

This reference manual contains a section on the roles and responsibilities of the parties involved, a summary of methodologies and a section of questions and answers triggered during the disaster damage assessment process.

This reference manual is intended for professionals skilled in the rapid assessment of damage to buildings and other infrastructure after an earthquake or hurricane.

As with any technical document, revisions and updates are made periodically to keep the information up to date, and to allow new information to be added as lessons are learned.

If you have any suggestions or comments for future versions, please write to the College National des Ingenieurs et Architechtes Haitien (CNIAH), no 19, Rue Cheriez, Canapé Vert, Port au Prince, Haiti - HT6110 and to the Ministere des Travaux Public Transport et Communication (MTPTC), 29 Rue Toussaint Louverture, Delmas 29, Haiti).

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CHAPTER 1: INTRODUCTION AND GENERAL DESCRIPTION

INTRODUCTION

Haiti is a Caribbean country occupying the western part Hispaniola, south of the boundary between the North American and Caribbean tectonic plates.

Figure 1: Geographical location of Haiti

The movements of these plates generate tectonic faults that cross the entire island. The seismic risks in Haiti are clearly visible on the maximum ground acceleration (PGA) maps extracted from the Documentation des Cartes de Risques Sismiques Initiales (Documentation of Initial Seismic Risk Maps) drawn up specifically for Haiti in 2010. The seismic threat is real in Haiti, and major tectonic are located in the Central Plateau, along the north coast and down to the Port-au-Prince metropolitan area.faults

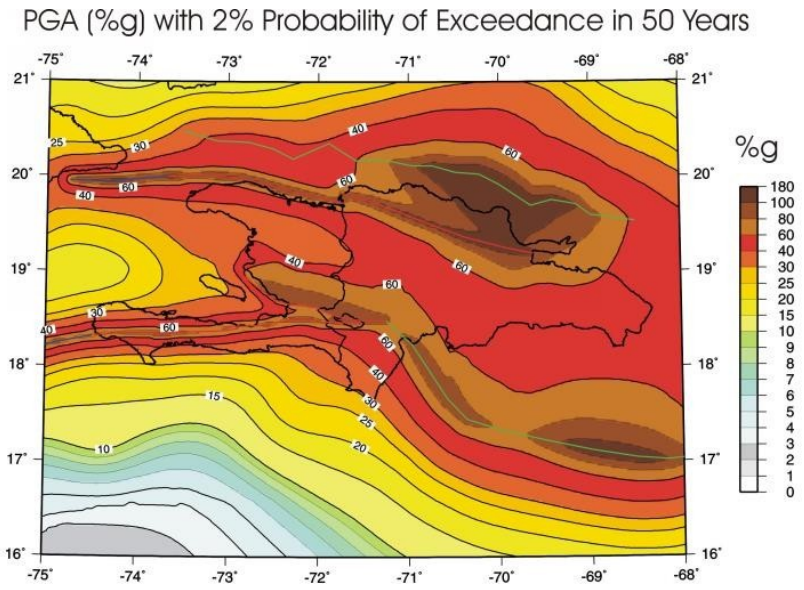


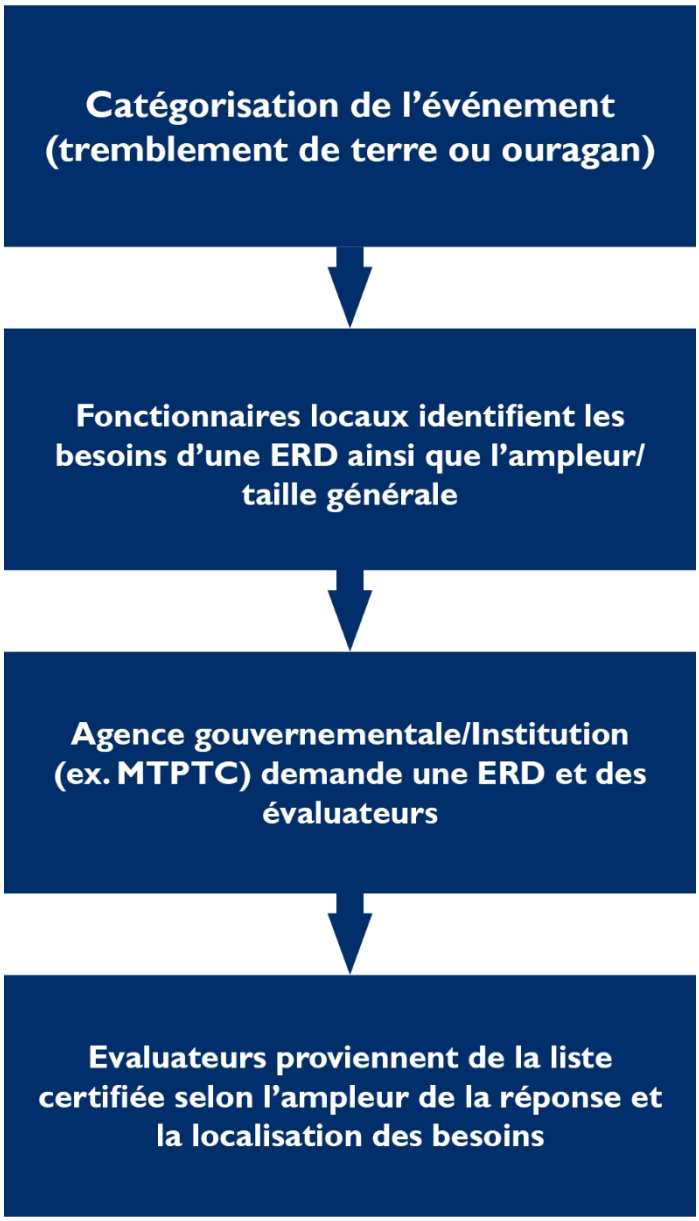
Figure 2: PGA map of Haiti

In addition to seismic , risksHaiti is also exposed to cyclonic activity.

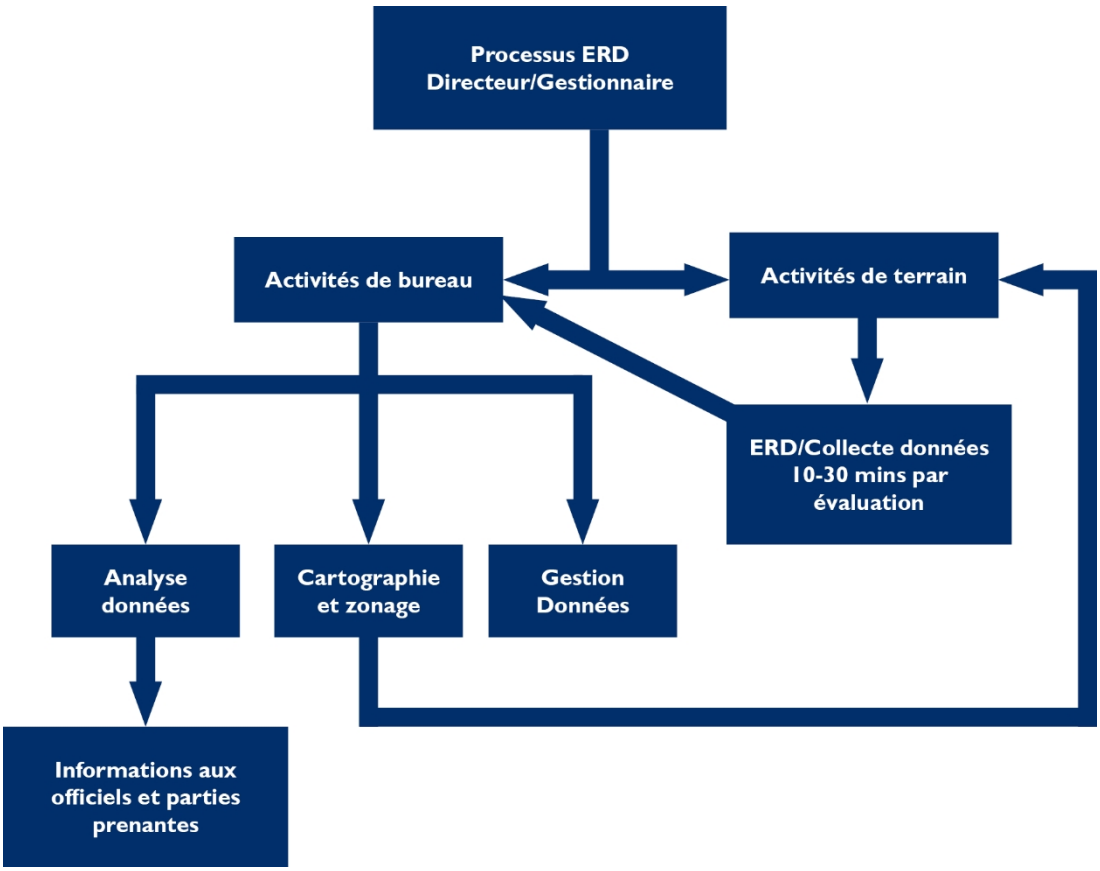
Rapid damage assessment (RDA) is generally carried out after a natural disaster (earthquake or cyclone) by professionals qualified in the rapid assessment of buildings and structures, who classify them according to their degree of vulnerability. The process consists of a rapid assessment based on expert judgment and a visual evaluation of the damage incurred. The red, yellow or green display of buildings is essentially intuitive and serves only to identify the degree of safetystructure's . It should be noted that this assessment only concerns the behavior of buildings (or structures) in the hours following a disaster, and not their behavior in future events.

The training is divided into two parts, the first consisting of a rapid assessment of damage and the second an assessment of damagehurricane . The first component contains an overall review of basic engineering principles, followed by an assessment of the methodology and approach adopted. The second part covers an overall review post-hurricane engineering principles, followed by an assessment of the methodology adopted. These two parts are designed to refresh participants' memories on the selected topics.

The diagram below illustrates the general process for initiating a Rapid Damage Assessment (RDA). This a purely descriptive process, which may change depending on conditions, administrative procedures, etc.



Once the ERD rapid damage assessment process has been triggered, it is divided into two types of activity: field activities and office activities. It is essential to create synergy between these two mutually reinforcing activities. The diagram below shows processtypical DRE . However, scope and intensity of activities may sometimes require a few people, and sometimes hundreds.



Rapid damage assessment is part of the disaster preparedness plan that must be put in place before a disaster strikes. During the earthquake that shook Port-au-Prince and Léogâne in 2010, there was no DRE plan, which caused months of delay initiating indamage assessment. It is important to keep active damage assessment in order to reduce response time and provide important and useful information to stakeholders.plan

CHAPTER 2: QUALIFICATION CRITERIA

QUALIFICATIONS

Qualifications ensure a minimum level of competence to protect the population. The minimum requirements for qualification and award of a Rapid Earthquake and Hurricane Damage Assessment Certificate are as follows:

1. Be a practicing , engineerarchitect or specialist engineer in public .buildings
2. A degree engineering or architecture.
3. Be an active member of CNIAH as an engineer or architect in accordance with the by-laws.
4. Register with CNIAH as a candidate for a Certificate Rapid Assessment of Earthquake and Hurricane Damage. See chapter 3 for more information.

Once the application has submitted beenand accepted by CNIAH, the candidate will be registered for the next seminar and certification . examThe candidate must attend all classroom training courses and pass a certification exam at the end. This exam consists of multiple-choice questions on the subjects studied, and is graded on a pass/fail basis.

Upon completion of all of the above, the applicant will receive a personal qualifying him or her as a person who can provide rapid damage assessment services when requested.identification number

CHAPTER 3: REGISTRATION AND VALIDITY PERIOD

RECORDING

Completed applications for training in Rapid Damage Assessment after earthquakes and hurricanes must be sent to the CNIAH office, during working hours, or to another public or university entity.

Once the request is received, it will be reviewed and processed accordingly. You will be notified by e-mail of updates to any review request.

PERIOD OF VALIDITY

Once the application has been , validatedthe training courses attended and certification , the candidate will receive a personal identification number qualifying him/her as a passed "Rapid Assessment of Earthquake and Hurricane Damage" (hereinafter referred to as "Assessment"). This number will remain in effect for three)(3 years from the date of issue.

The evaluator may submit a request for renewal to CNIAH, at least 60 days before the expiry of the validity . periodThe evaluator is required to review the current training , and receive certification that he/she has read and understood the updated documents. CNIAH reserves the right to require the evaluator to undergo another certification examination in the event of significant changes.manual

CHAPTER 4: RAPID ASSESSMENT OF POST-EARTHQUAKE DAMAGE

INTRODUCTION

Rapid Earthquake Damage Assessment (REDA) is the rapid evaluation of the safety of buildings and infrastructure in the days following an earthquake. DRE enables qualified engineers to carry out a rapid and assessmentintuitive . The red, yellow or green labels resulting from the DRE give an idea of the degree of vulnerability of the building/structure after the earthquake. The behavior of buildings in previous disasters is not representative of their behavior in future disasters.

The DRA and the corresponding labeling provide government officials and the general public with understandable information to ensure greater safety for the population.

TOOLS

The DRE can be done on paper or electronically. The program comes in the form of a software package that can be used on Android or Apple . devicesPlease refer to chapter 7 for further technical information. In addition, a model of the paper form is included at the end of this chapter. The information and processes are similar, but the digital version is preferred for its rapid access to results.

TECHNICAL INFORMATION

This section can be used as a real-time guide for certified . assessorsThe manual alone cannot fulfil all the objectives of certification training. The information in the ERD is divided into the following categories:

- Inspector and building identification
- Building , descriptionlocation and contact
- Damage assessment
- Sketch/Photo
- Display/Labeling

Inspector and building :identification

Inspector ID - Certification number issued to the assessor by the competent authority. This number is unique to each individual and will be used for login purposes.

Building identification - Identification may vary depending on the model used for evaluation. In the case of digital data collection, this information will be entered into the software used.

Inspection date/time - In the paper checklist, write the date and time in format Day/Month/Year and circle the time in 12-hour AM/PM . formatThe time can be recorded at the start of the evaluation. In the case of digital data collection, this information will be entered into the software used.

Building , descriptionlocation and contact:

Area inspected - document where the inspection was carried out. Exterior only or exterior and interior.

Building name - indicates the name of the building or a reference that would help locate or identify the building in question.

Building address - the building address contains the house number, street name/ cul-de-sac, town and zip code (if applicable). Information must be in writing and use only standard abbreviations.

GPS coordinates - GPS coordinates are used precise identification purposes and should be taken as close to the house as possible to avoid mapping . errorsIn the "paper" , they should be recorded in decimal form, using the convention that west and south are considered negative (-). versionIn the electronic version, they will be entered in the software used.

Contact person and telephone - this section is optional. If the resident does not wish to provide this information, select "N/A". If the does residentgive it, note in it both the paper and electronic versions, and add the area code/country code.

Number inhabitants - indicates the number of people living in the area. If this is not a residential area, enter "N/A".

Year of construction - enter the year of construction in the Year . fieldIf the year is not available, enter "N/A".

Number of levels above/below ground - Levels should be counted starting with the first floor as level 0, then each level above/below will be counted as 1.

In the graphic below, the building should be considered as having 2 levels, one above and one below, and described as a 2/1 building.

A "sunny" basement is characterized by a wall slope exposed to daylight, or when the upper part of the basement is above ground level.

A basement is any room or floor below the first floor.

Approximate area - Write the approximate area of the building in square . metersUse quick methods to measure area, such as number of steps or electronic distance measurements.

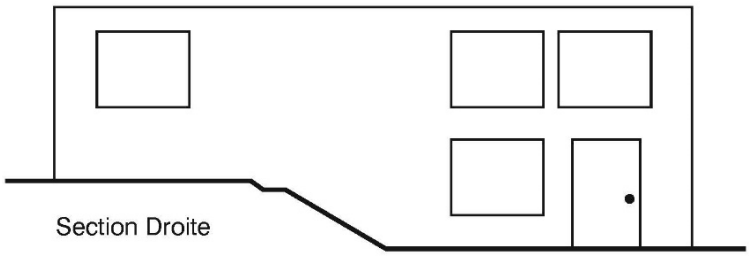


Figure 3: Example a sunny basement

Soil , descriptionvisual assessment or other documentation is based on a geotechnical map of the area. The classifications are general, and soils are not the focus of the assessment, but form part of it to facilitate data analysis following the assessments.

The site/slope is usually included in the evaluation obtain the basic site and aid subsequent data analysis. conditions The different types of construction are as follows:

- Wood construction - The structure of the building (above ground)levelincluding walls, floors and roof, is essentially made of wood.
- Steel frame - Refers to buildings with steel . structureThese buildings typically use wide-flanged columns that support a steel deck or slab system. Steel framing elements primarily resist gravity loads. This does not include the construction of lightweight metal uprights.

Figure 4: Example of steel structure construction

Concrete structure with block masonry wall - A type of construction where gravity loads are protected by a system of concrete , beams and columnsusually concrete slabs extending between the beams. The space between the beams and columns is filled with cement block walls, which serve to partition the space. This type of construction is very common in Haiti.

- Concrete structure - sometimes called a reinforced concrete portal frame because concrete columns and beams resist both gravity and lateral .forces
- Concrete shear wall - The building's gravity system generally consists of concrete columns and beams / slabsbidirectional . However, lateral loads are resisted by concrete shear walls.

Figure 5: Special reinforced concrete shear wall (unidirectional) in full construction

- Unreinforced Rock Masonry (URM) wall - Refers to buildings constructed with little or no steel reinforcement. A common example of these types of construction are rock masonry buildings in which gravity and lateral resistance come from URM . elementsLa Citadelle is an example of this type of structure in Haiti.

Figure 6: Construction with rock masonry walls

- Reinforced masonry - Reinforced masonry is concrete reinforced with structural steel in the block cells.block masonry

Figure 7: Construction of a concrete block masonry shear wall

- Other - This construction is suitable for buildings that do not fit into the other categories. Fill in the box to specify the system.

The section on different roof types contains four options. Some buildings may have more than one roof type, but the option selected here is for the main zone. The sketch can also be used to describe different roof types.

- Concrete slab - Any system consisting of a reinforced concrete slab resting on load-bearing elements. These roofs are common in Haiti.
- Wood - describes a plywood (or similar) covering that extends between the roof . joistsTypically, shingles are used for these types of roof. They are not common in Haiti.
- Tôle - A very common roofing system in Haiti. The sheet metal extends between the purlins (usually reinforced by the joists). These types of roofing are very common in Haiti.
- Other - applies to buildings that do not fall into any of the above .three categories

Building form refers to the architectural . planIt helps to recognize the general behavior of a building at the time of a disaster, i.e. there is a certain correlation between the damage incurred and the shape of the buildings. These shapes can be described as follows:

- Square/rectangular - "regular" shape, common in Haiti.
- Triangular - building with three facades. Rare in Haiti.
- Large diaphragm courtyard/opening - refers to a square or rectangular with an opening in the middle.building

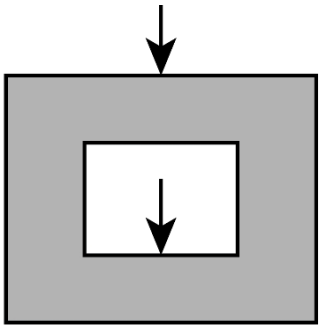


Figure 8: Court/plane form with large aperture

- Cross - usually found in churches.
- O - Round .shape
- E - E-shaped. A building that contains joints between the three parts on levels is not considered to be "E"-shaped.
- H - H-shaped. A building containing separation joints is not considered an "H"-shaped building.
- L - L-shaped, confirming that there areno joints between the parts.
- T - In the shape of a "T, confirm that there are no joints between the horizontal vertical .parts
- U - U-shaped, confirm that there are no joints between the parts.
- Other - applies to buildings that do not fall any intoof the other categories.

Irregularities. Vertical irregularities can be observed, and generally associated with more extensive damage.

- Soft floor - the first floor (first level above ground) is higher. In general, this level should be 20% or more higher than the other levels.

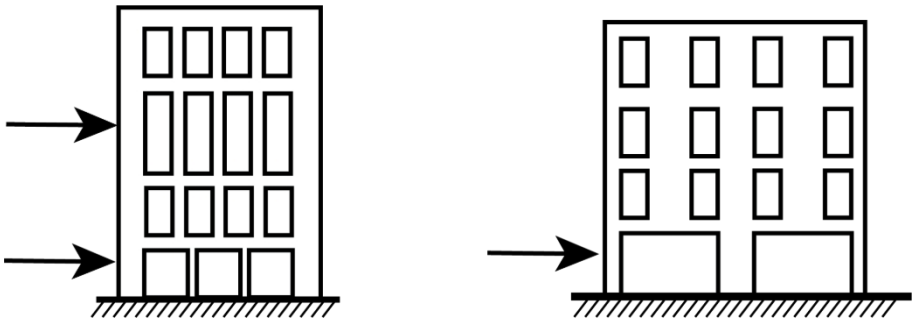


Figure 9: Examples flexible ; floorsarrows indicate where damage is frequent

- Façade setback - occurs when the building's surface area changes significantly in relation to its height.

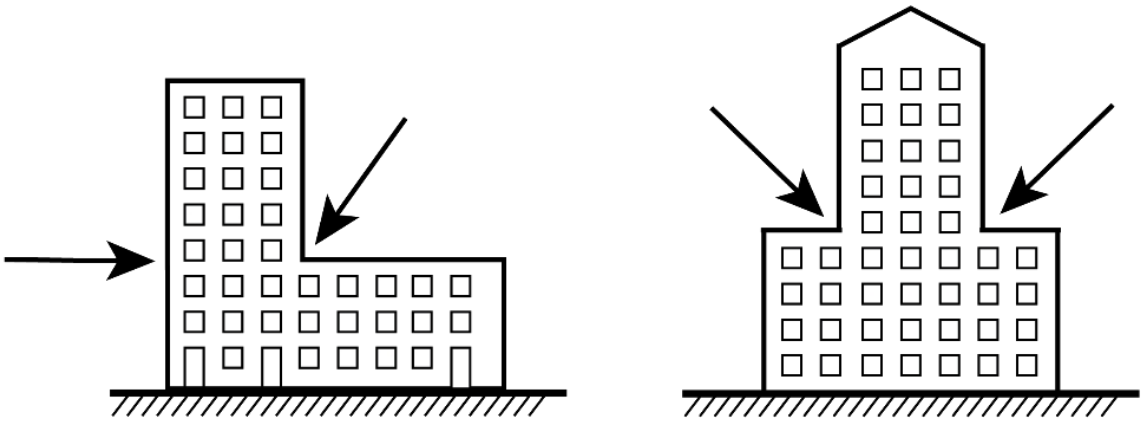


Figure 10: Example of facade ; shrinkagearrows indicate where damage occurs frequently

- Coupled walls- shear Coupled walls result when aligned shear are linked by a "beam". walls If these walls are not properly designed or constructed, they can seriously damage the building.

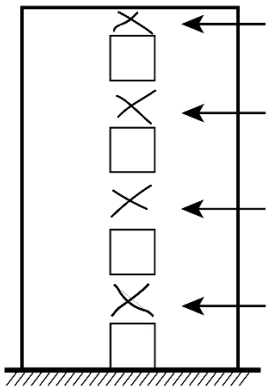


Figure 11: Coupled ; shear wallsarrows indicate where damage occurs frequently

- Short columns - Also known as captive columns, these are columns shortened by an adjacent rigid element such as a wall.

Figure 12: Example a short , columnMexico City, October 2017

- Pounding - Insufficient space between two adjacent buildings that strike against each other and can cause significant damage.

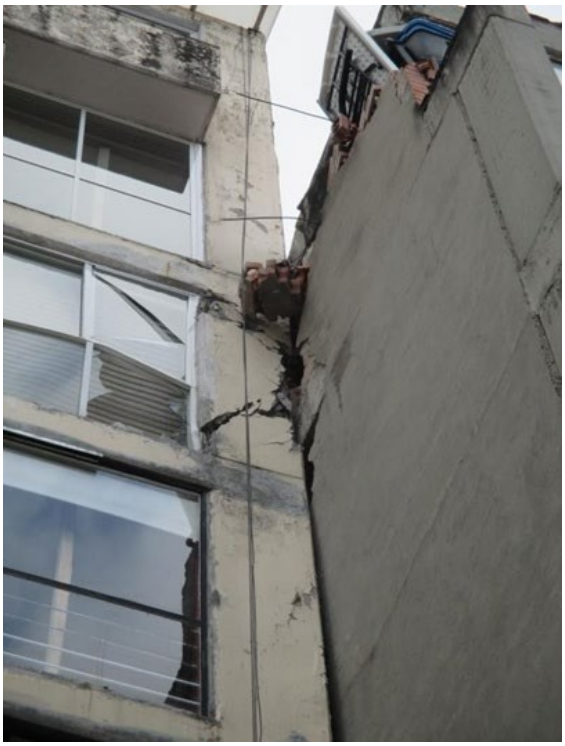


Figure 13: Example of damage caused by pounding buildings, Mexico City, October 2017

Main :use

- Residence - single-storey (single-family).
- Residence - multi-level (multi-family) such as apartments or condominiums.
- Public building - building used mainly for public .meetings
- Emergency services - Buildings used for emergency services such as hospitals, fire , stationspolice stations, etc. An in-depth assessment is required for these types of structure.
- Shopping center - buildings designed primarily for commercial activities/transactions. For example, wholesale and retail stores.
- Offices - offices or other workspaces.
- Industry - buildings dedicated to the production/manufacturing of products. They may contain chemicals that could cause additional hazards.
- Government - Buildings for government . servicesThey can also be a subset of offices.
- Historic building - representing an important story from the past. This type of building is often associated with the age of the building's construction, but also with events that took place in the past.

have taken place in the neighborhood. The ISPAN buildings fall into this category, although there are others.

- School - Public or private educational establishments, including schools for adults.
- Other - Buildings that do not fall into one of the above .categories

Damage :assessment

The information in this section comes directly from the ERD process. Select the appropriate . columnNote that the percentages refer tobuilding .as wholea

A global view of damage:

- Total or partial collapse - part of a structure (or a floor) or the whole structure has collapsed, giving rise to the mention **Dangerous Access.**
- A building or storey with a slope will be marked **Dangerous Access.** In this casedimension the degree of slope in cm and include this information in the , you'll need to comments.
- Hammering of adjacent building results in **Hazardous Access** or **Limited Access.**
- Partial displacement of the building or foundation results in the designation **Dangerous Access** or **Limited Access**.
- Other observations not mentioned above will be noted appropriate to the state of vulnerability of the building or structure.

Damage to structural :elements

- Signs of movement of the foundation give rise to a **Limited Access** rating, while major displacements or serious fractures give rise to a **No Access rating.**
- The vertical load-bearing capacity of the roof or floor represents the ability of horizontal structures to resist gravity loads. This may include displaced walls in a load-bearing wall system, and a **Dangerous Access** sheet is applied to the building.
- Cracks or spalling in columns and/or pilasters give rise to a rating**Dangerous Access** or **Limited Access** . If the capacity to withstand gravity loads has not been compromised, a **Limited Access** rating is applied. If the capacity to withstand gravity loads has been greatly reduced, a rating **Dangerous Access** is more appropriate.
- Cracks or spalling in slabs, beams or joists give rise to a rating**Dangerous Access** or **Limited Access** . If the capacity to resist gravity loads has not been compromised, a **Limited Access** rating is applied. If the resistance to gravity loads has been greatly reduced, a rating **Dangerous Access** is more appropriate.

- Collapse of interior & exterior walls results in a **Dangerous Access** or **Limited Access** rating. If the gravity load capacity has not been compromised, a **Limited Access rating** is applied. If the capacity to withstand gravity loads has been greatly reduced, or the structure has been demolished, a record **Dangerous Access** is more often applied.
- Other - this category is reserved for the judgment qualified experts.

Geotechnical :damage

- Slope can failure occur whether or not there is a retaining wall, posing serious structural hazards upstream and downstream. Intact parts a wall or slope are also at risk because the earth becomes a viscous liquid and can continue to move. In such cases, sheets **Limited Access** or **Dangerous Access** are applied, depending on the conditions observed.
- Ground movements and faults can indicate underground geotechnical conditions and leadto the designation of **Limited Access** or **Dangerous Access,** depending on the conditions observed.
- Soil liquefaction occurs when granular soil particles break off grain by grain during an earth tremor (or other vibration). Liquefaction passes through three stages, and can lead to settlement or tilting of the building. If liquefaction damage, a **Limited Access** or **Hazardous Access** card may be applied, depending on the conditions observed.
- Damage to underground structures may give to rise a **Limited Access** notice.
  or **Dangerous Access** depending on the conditions observed.
- Other - This section is reserved for expert .

Sketch/Photo:

Digitized photos are often used in a DRA, and serve as a reference for the future location of buildings. They can also document conditions that are difficult to report on a checklist or sketches. However, sketches are sometimes necessary, depending on the decisions of the office responsible for the building.

Sketches are a graphic representation of a building and can be used to indicate conditions or areas observed.

The Bureau responsible for the building may request a damage estimate, which will focus on the amount of damage to the structure as a whole, taking into account the percentage of losses in general and the percentage of losses to the building.

Sketches should be simple but contain right angles and approximate . Unless otherwise specified, they must represent the area of the building and be recorded as supporting documents.dimensions

Labeling

Survey sheets must comply with the standards of the Bureau/Juridictions responsables du bâtiment. They generally represent use of a standard, clear and recognized . display techniqueThis may be a paper label, spray paint or other applicable method. It's very important that the different signage teams are on the same wavelength, using a clear language with each other and with the public. Signage is used to clearly indicate the degree of vulnerability of a given structure.

 "Placards" or the labeling of a building has important implications, because if it's too conservative people are unnecessarily evacuated from their homes or businesses. Furthermore, "under-labeling" can expose people to safety risks.

The cards come in three different colors: green, yellow and red. Green indicates that thereno significant structural damage and that the building is habitable. Yellow indicates moderate structural damage, but no immediate danger of collapse. Red means that the building is in real danger of collapse and access is forbidden.

Checklist:

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RAPID ASSESSMENT OF5 EARTHQUAKE DAMAGE INSPECTOR AND BUILDING

IDENTIFICATION

Inspector ID_____ Building ID: _____

Area inspected:

Exterior only

Outdoor and indoor

Date and time: _____ AM/ PM

hour

EVALUATION RESULT Green (No risk) Yellow (Restricted)access Red (Access forbidden)

Building name: __ Address: _____

(téléphone)

Contact person: _____

Number occupants: _____

Year of construction: _____

GPS :coordinates _____

Approx. area _____

Number floors: Above ground_____

Below the sol_____

Soil : descriptionSand Loose soilFarm

Rock Site/slope description: Flat

areaModerate slope Steep slope

Type of construction:

frame Timber

Reinforced concrete structure Reinforced masonry

Steel frame Shear wall Steel structure

☐ Concrete frame filled with block masonry

Unreinforced masonry (URM)

Other_____

Roof :type Concrete / Slab Wood Sheet metal ☐ Autre:_____

Building shape (Plan):

Square/Rectangular Triangular Courtyard Cross 0 E H L T U

Other_____

Irregularities:

Flexible floor Façade shrinkage Duchlea walls Short posts Interlocking

Primary Occupancy:

Residence (single-family) Residence (single-family) Administration building Emergency services Shopping center Office Industrial Government

Historic building School Other _____

EVALUATION OF DOI'1/'îAGES Tinspectiodnu building to check the conditions below, tick the appropriate)œlonne

Damage :report	None/Mineurr (0-109	Moderate (10-50Æ)	Severe (50-10096)	Please note:
General:				
Total or partial collapse	@	☐	☐	
Leaning building/floor	@	☐	@	Maximum lean CM:
Clash adjacent building	@	☐	☐	
Fondahon inadequate	Ë	☐	☐	
Other_____	@	☐	☐	
Structural :damage				
Foundations	☐	☐	☐	
Vertical load capacity of roof/floor	☐	☐	☐	
Cracks in , pilasters/ Chipping	☐	☐	☐	
Fissuœ dale, goutne, poflnelefssuæ/ éoilage	☐	☐	☐	
Int & M cracks/collapsewall	☐	☐	☐	
Other (Specify in remarks)	☐	☐	☐	
Non-structural :damage				
Damage to parapet, canopy, stairs	☐	☐	☐	
Siding systems and Windows	☐	☐	☐	
Ceilings & Lighting Interior	☐	☐	☐	
walls (partitions)	0	○	○	
Elevators	☐	☐	☐	
Staircases and exits	☐	☐	☐	
Electricity, Gas/Fuel	☐	☐	☐	
Other (Specify in remarks)	☐	☐	☐	
Geotechnical risksi				
Landslide	☐	☐	☐	
Soil , movementCracks	☐	☐	☐	
Damage to underground structure	☐	☐	☐	
LigUéfäCÈiOFI	☐	☐	☐	
Other (Specify in remarks)	☐	☐	☐	

2

CHAPTER 5: RAPID ASSESSMENT OF POST-HURRICANE DAMAGE

INTRODUCTION

Hurricane Rapid Damage Assessment (HDDA) is the rapid evaluation of the safety of buildings and infrastructure in the days following a hurricane. DRA enables qualified engineers to carry out a rapid and intuitive assessment. The red, yellow or green sheets resulting from the DRA give an idea of the degree of vulnerability of the building/structure after the hurricane. The behavior of buildings in previous disasters is not representative of their behavior in future disasters.

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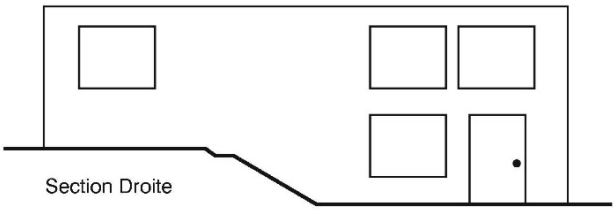


Figure 14: Example a sunny basement

Building :type

- Accommodation for one or two families
- Residence/home/business
- Low-rise multi-family construction
- Medium-sized construction
- Low-rise commercial construction
- Other

The section on different roof types contains four options. Some buildings may have more than one roof type, but the option selected here is for the main zone. The sketch can also be used to describe different roof types.

- Concrete slab - Any system consisting of a reinforced concrete slab resting on load-bearing elements. These roofs are common in Haiti.
- Wood - describes a plywood (or similar) covering that extends between the roof . joistsTypically, shingles are used for these types of roof. They are not common in Haiti.

- Tôle - A very common roofing system in Haiti. The sheet metal extends between the purlins (usually reinforced by the joists). These types of roofing are very common in Haiti.
- Other - applies to buildings that do not fall into any of the above .three categories

Main :use

- Single-family homes
- Residence (multi-family) such as apartments or condominiums.
- Shopping center - buildings designed primarily for commercial activities/transactions. For example, wholesale and retail stores.
- Offices - offices or other workspaces.
- Industry - buildings dedicated to the production/manufacturing of products. They may contain chemicals that could cause additional hazards.
- School - Public or private educational establishments, including schools for adults.
- Government - Buildings for government . servicesThey can also be a subset of offices.
- Public building - building used mainly for public .meetings
- Emergency services - Buildings used for emergency services such as hospitals, fire , stationspolice stations, etc. An in-depth assessment must be carried out for this type of structure.
- Historic building - representing an important story from the past. This type of building is often associated with the building's age of construction, but also with events that took place in the neighborhood. ISPAN buildings fall into this category, although there are others.
- Other - Buildings that do not fall into one of the above .categories

Damage :assessment

The information in this section comes directly from the ERD process. Select the appropriate . columnNote that the percentages refer tobuilding .as wholea

A global view of damage:

- Total or partial collapse - part of a structure (or a floor) or the whole structure has collapsed, giving rise to the mention **Dangerous Access.**
- Partial displacement of the building or foundation results in the designation **Dangerous Access** or **Limited Access**.
- A building or storey with a slope will be marked **Dangerous Access.** In this casedimension the degree of slope in cm and include this information in the , you'll need to comments.
- Damage to primary elements, such as shifting walls or buckling roof trusses, may result in a rating**Dangerous Access** or **Limited Access** .

- As result of athis event, the risk scouring, erosion or rupture of the slopes may be marked **Dangerous Access or Limited Access**. The passage of a hurricane can also cause high water flows, resulting in this type of hazard.
- Hurricanes can cause power lines and poles to fall or cut off power completely, posing a serious danger to occupants. Cables/lines or poles leaning over a building may result in a **Limited Access** or **Dangerous Access** sign.
- Leaning trees or parts of trees are a hazard to buildings, particularly on light , roofsand may be marked **Limited Access** or **Dangerous Access**.
- Other - can be used other whole-building observations that don't fall into these categories.

Sketch/Photo :

Digitized photos are often used in a DRA, and serve as a reference for the location future of buildings. They can also document conditions that are difficult to report on a checklist or sketches. However, sketches are sometimes necessary, depending on the decisions of the office responsible for the building.

Sketches are a graphic representation of a building and can be used to indicate conditions or areas observed.

The Bureau responsible for the building may request a damage estimate, which will focus on the amount of damage to the structure as a whole, taking into account the percentage of losses in general and the percentage of losses to the building.

Sketches should be simple but contain right angles and approximate dimensions. Unless otherwise specified, they must represent the area of the building and be recorded as supporting documents.

Display:

Survey sheets must comply with the standards of the Bureau/Juridictions responsables du bâtiment. They generally represent the use of a standard, clear and recognized display technique. This may be a paper label, spray paint or other applicable method. It's very important that the different teams signage are on the same wavelength, using a clear language with each and with the public. Signage is used to clearly indicate the degree of vulnerability of a given .structure

"Placards" or building signage has important implications, because if it's too conservative people are unnecessarily evacuated from their homes or businesses. Furthermore, "under-posting" can expose people to safety risks.

Checklist:

USAID DU PEUPLE AMERICAIN

CNIAH

miyamoto.

POST-OURAGAN EVALUATION RAPIDE DES DOMMAGES

(USAID/OFDA, CINAH, Miyamoto International)

IDENTIFICATION DE L'INSPECTEUR ET DU BÂTIMENT

ID de l'inspecteur: _____

ID du bâtiment: _____

Date et heure: _____ _____ heure AM / PM ☐ ☐

Zone inspectée:

☐ Extérieur seulement

☐ Extérieur et intérieur

RÉSULTAT DE L'ÉVALUATION ☐ Vert (Aucun risque) ☐ Jaune (Accès limité) ☐ Rouge (Accès interdit)

Nom du bâtiment: _____

Adresse: _____

_____

Nombre d'étages: Au-dessus du sol: _____

Au-dessous du sol: _____

Personne de contact: _____ (téléphone)

Nombre d'occupants: _____

Année de construction: _____

Coordonnées GPS: _____

Superficie approx. _____ m²

Type de Bâtiment:

☐ Une ou deux habitations familiales ☐ Faible-hauteur plusieurs familles ☐ Commercial faible-Hauteur

☐ Residence / Commercial ☐ Mi-Hauteur ☐ Autre: _____

Type of Roof: ☐ Béton/dalle ☐ Bois ☐ Toles ☐ Autre: _____

Primary Occupancy:

☐ Residence (Unifamiliale) ☐ Residencel (Plusieurs famille) ☐ Bâtiment administratif ☐ Services d'urgence

☐ Commercial ☐ Bureaux ☐ Industriel ☐ Gouvernement

☐ Historique ☐ École ☐ Autre: _____

EVALUATION OF DOf-1I "1AG ES (! of the nspecfionbuilding to verify the conditions below, tick the appropriate)œlonne

Damage :report	None/Mineurr (0-10%)	Moderate (10-50%)	Severe (30-100°S)	Please note:
General:				
Total or partial collapse	☐	☐	☐	_____
Building without foundation	☐	☐	☐	_____
Leaning storey building or Damage	☐	☐		Maximum inclination in CM :
to primary elements Geotechn i9ue	☐	_____	☐	
risk	☐	Wall section		
Power equipmentlines/Submersible	☐	☐		Scouring, erosion, etc.
Leaning trees 'ü i owa i' rz "i" n<"i	☐	☐	☐	_____
Others_____	☐	☐	☐	_____
		☐	☐	_____

Observations:

Roof damage only	Yes	Q	No
Block masonry or concrete wall	Yes		No

CHAPTER 6: FIELD PRACTICES / SAFETY AND QUALITY ASSURANCE

FIELD PRACTICE

Disasters bring chaos and disarray, and the environment is always fraught with danger. The appraiser must be aware of , thistake precautions and ensure that personal is paramount.safety

Assessments should always be carried out in teams of two, facilitate safety, efficiency and quality of work. These teams must keep in constant communication with each other, and report their positions to their team leaders from time to time.

Inspectors must always use the following protective equipment:

- Helmets
- Steel-toed boots
- Fluorescent vest
- Long pants, e.g. jeans
- Safety goggles
- PPE graph

In addition to the mandatory equipment listed above, inspectors must wear ear and breathing masks. Access to services is always limited in the aftermath of a disaster, and inspectors must make sure they have drinking water, as potable water sources will not always be available.

They will also :

- Cards
- Survey sheets/materials
- Plugs and accessories
- Communication equipment
- Feathers, paper, etc.
- Metric tape (unless supplied by designated teams)
- Identification parts
- Flashlight

Other things that may be useful :

- Measuring ?equipment
- Useful tools
- Gloves
- Hand sanitizer
- Emergency/field kit

GENERAL SAFETY

Safety is always paramount. Be alert to hazards and do not enter a damaged building.

During assessments, beware of broken wires and avoid contact with power and poles. lines Don't assume they're not live, and follow the instructions for reporting them to the team.

When moving around buildings, look everywhere for danger. Don't take notes as you walk, because there may be hidden dangers in your path.

Inspect the horizon and always look for fallen objects before a building.

Before entering a building, try to establish contact with the occupants to make sure they know who you are and that you are working in an official . capacityWalk around the building , firstif possible, to see if there are any collapses and signs of dangerous equipment or materials, fuel or signs of fuel leaks.

When assessing a building, don't smoke or use other types of combustion, as there may be combustible gases in the vicinity.

When you're inside the building, pay close attention to your surroundings, especially to objects that have fallen to the ground (usually as result of a tremor), as things that seem stable may not be. to you Be careful when opening doors or moving objects. Don't go in if you can't see clearly ahead. Always think SAFETY first.

If you meet someone who needs help, follow the team's instructions.

SAFETY AFTER AN EARTHQUAKE

After an , there are often aftershocks that can cause further damage or shake already damaged . structuresKeep yourself informed of the nearest shelters.safety perimeters and

When surveying a building, look for geotechnical hazards especially ,slope or retaining , wall failuressigns of liquefaction or cracks. These conditions can represent enormous hazards.

Collapse can rangefrom damaged parapets to water tanks and air conditioners.

HURRICANE SAFETY

After a hurricane, garbage is not usually collected, and flooding can spread pathogenic . microbes/virusesAssessors should avoid stagnant water and seek help if they suspect they have been contaminated.

QUALITY ASSURANCE

It is important have a quality assurance (QA) plan for each stage of this methodology. The implementation plan and the QA plan form a single plan. The ERD process is launched immediately to provide decision-makers and stakeholders with useful information quickly. This process contains "real-time" QA procedures to facilitate consistency, reliability and accuracy.

Assessment teams are required to address quality assurance on several levels (around 5 assessment teams), led by a division manager. These teams are made up of two certified assessors who carry out a visual inspection of the premises, i.e. the first quality assurance plan. This exercise distributes the building . assessment tasksThe division takes charge of the second planmanager , which consists of resolving problems withindivision, maintaining the team's dynamism and being the point of contact and supervisor of the assessment work. The third and final plan includes those who play an intermediary , roleact as resources for the division heads and facilitate agreement between the various divisions.

CHAPTER 7: USING THE MOBILE APPLICATION

Documents submitted separately.

miyamoto. EARTHQUAKE + STRUCTURAL ENGINEERS

Relief applications

Manuel training

KoboToolbox

KoBoToolbox

Contents

This manual was created as training material for Miyamoto's team in Haiti. It a resource for team members on how to implement Kobo questionnaires in their data collection methods.

It provides pre-training advice and basic Kobo .knowledge

For more information about Kobotoolbox and a useful link, please visit the Kobo web page (https://www.kobotoolbox.org/).

This manual has been designed for users with a good knowledge Excel and a basic understanding of the Android platform.

What is KoboToolbox?

Gathering reliable information quickly in the event of a humanitarian crisis - particularly after a natural disaster such as a major earthquake or typhoon in a poor country - is the essential link in saving the lives of the most vulnerable.

Understanding the needs of the population is often neglected due a lack rapid means of gathering and analyzing this crucial information.

KoBoToolbox, developed by the Harvard Humanitarian Initiative, is a suite of open source tools data collection and analysis in humanitarian emergencies and other challenging environments designed to fill this gap.

Kobotoolbox (KOBO) is a suite tools enabling organizations collect, aggregate and visualize their data, as well as a powerful telephone replacement solution for your paper forms.

KOBO is built on the Android platform and can collect various types of form : text, location, photos, video, audio and barcodes.

KoBoToolbox

FEATURES

→ Free for humanitarian organizations

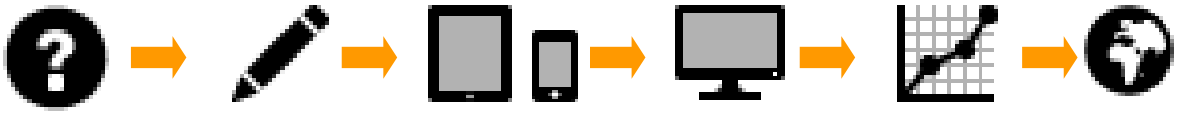
→ Open source

→ Quickly generate forms in electronic format

→ Enables data to collected beusing cell phones and tablets

→ Created by the University of Washington, International Rescue Committee & UNOCHA

What can Kobo do for you?



Idea → Building a form → Using mobile devices for collect data → Aggregate → Analyze → Card

Kobo provides users with solutions for :

Building a data collection form :

a. With a user-friendly Web-based interface https://kobo.humanitarianresponse.info/ (requiredInternet).access

b. Or with a more powerful and flexible , Excel formXLS Forme.

Create the survey using an Excel template or equivalent .Internet version

Collecting data with a smartphone or tablet :

a. The application Kobo must be installed on your device via : Kobotoolbox

Aggregate and analyze collected data:

a. Via a Web interface. Data can be submitted directly from any device to a server as soon as the survey is completed. However, there are two main drawbacks (confidentiality and Internet). requirementsBefore choosing this option, you should ask yourself:

1) Confidentiality: is the server public (like a google server?) Even if it's a server that your organization owns, the data will be transmitted via the public .telecoms network
2) Internet : accessIs there an operational data network (3G?)?

The main advantage of this method is that data will be transferred to the server, but can also be automatically converted to Excel format on the server.

b. Using ODK Briefcase : softwarethis is a simple program you need to install on your PC to convert the collected data (.xml files) into Excel. The main disadvantage (is it a disadvantage?) is that it requires manual intervention, as you'll need to copy the files containing the collected data to your PC. The main advantage is that it doesn't need a functioning network connection: you can do everything directly between the phones and PC. Through all these steps, Kobo will help you to carry out surveysfaster and more reliable , as you can implement methods to ensure that the data collected complies with a certain format, in a certain number of values....

What can't KOBO do for you?

We all tend to become over-dependent on electronic systems once we've learned how to use them.

Kobo is just a system that will greatly improve the way you collect data, but there are features that aren't available:

1. It won't design the questionnaire for you: there are many possibilities in terms of question types, ways of presenting questions... but it won't decide whether the question you ask is relevant or representative of a situation. Be careful when designing questionnaires: more data doesn't mean better analysis!

2. It won't create a schedule for your survey: it can't tell you how many beneficiaries you need to meet each day, or how many will be willing to answer your questions.

3. It won't give you the methodology to be used for a successful survey: you'll need to determine how many people to meet, where to conduct the survey, the selection process, sample size and so on.

Kobo is a tool for speeding up and simplifying surveys, 'but itno substitute for quality survey planning and design.

Who uses it?

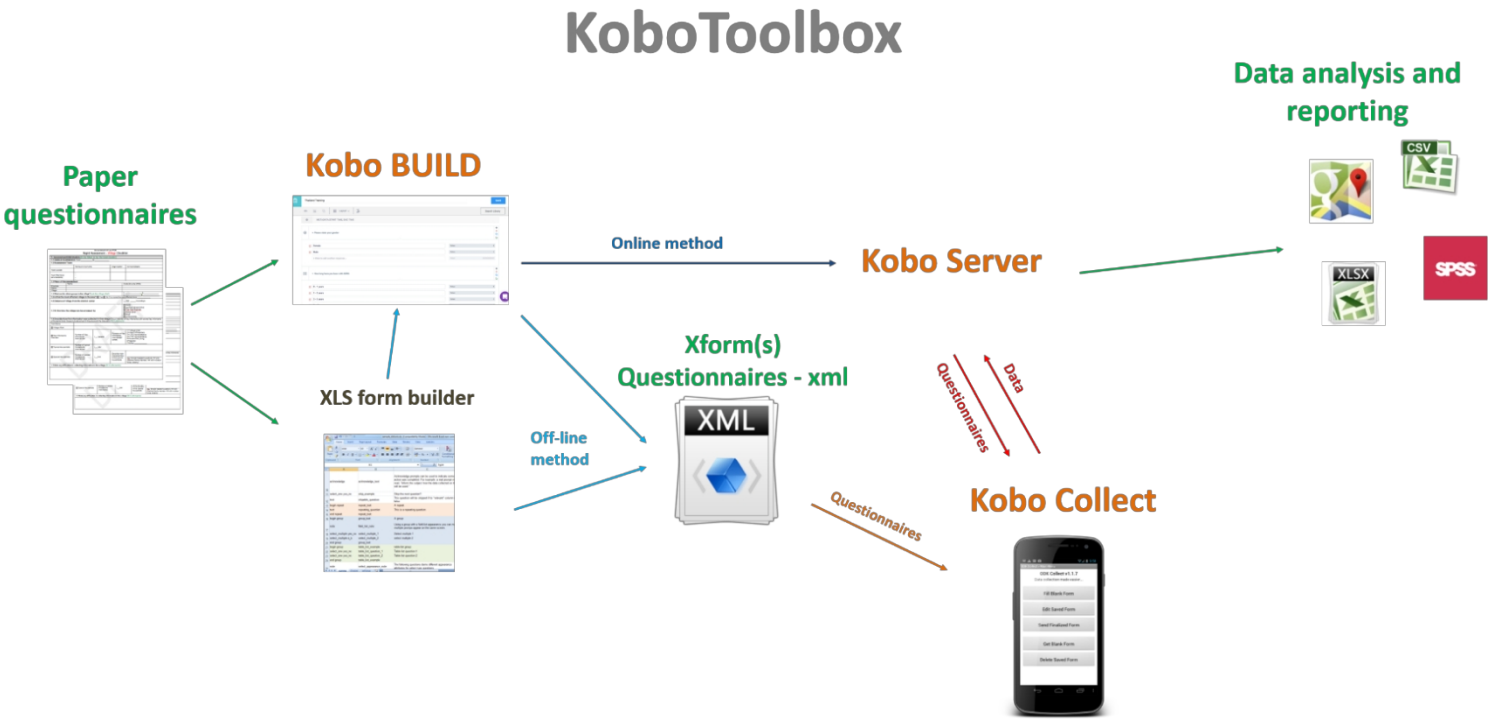
- !
- → Humanitarians
- → Scientists
- → Agriculture
- → Conservation
- → Environmental

Why?

- Easy to create a questionnaire a list of questions
- Regular updates
- Less room for error in answers
- Very fast
- Optimized for humanitarian work

Benefits

- Can used offline
- Low level of knowledge required
- Enumerators can be trained quickly
- Designed for a humanitarian environment (disaster)



What types of questions are available?

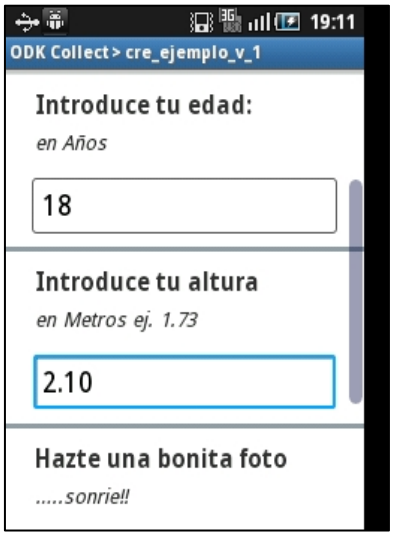
Question string (field):

These prompts allow a user to enter text using the device's keyboard.

This can be useful for recording names. Text difficult to analyze and should be used with care (typos can lead to lengthy clean-updata).

For example: name of beneficiary, address...

(Numbers) Integer / Decimal:



This is the basic field for numbers (including integers and decimals).

Decimals can represent decimal numbers with a precision of around 15 digits.

Example: (integer) age of beneficiaries, (decimal) child's , weight, age, etc.)height

Using whole numbers enables calculations to during analysis (e.g. for nutrition surveys: stunted growth, decline, etc.).be made

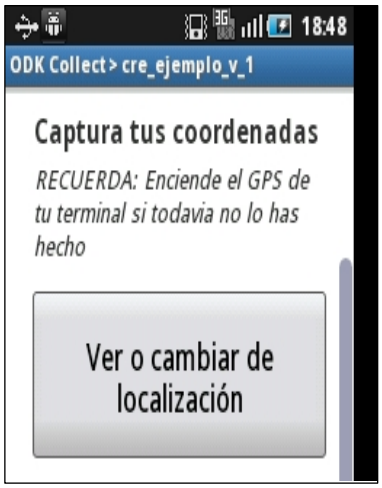
Date and time :

It may be important integrate a date and time. By default, the time and date will be set by the device, but can be adapted and modified if required.

Example: survey , datedate of birth of beneficiaries...' children

Depending on your phone's version of the Android operating system, the calendar may look slightly different.

Geolocation:



Smartphones can be configured to location signals from GPS satellites or wireless networks.

Kobo will simply use these methods built into the phone to obtain the location. Accuracy is the same as your device's GPS accuracy (generally less than 10 meters).

Example: if you're looking for distribution locations, you can use this function to save the location you've found, the village for the next evaluation...location

Bar code reader (codeQr) :

Barcode detection relies on third-party applications (such as Zxing Barcode Scanner) or may already be available on devices by default.

Image, audio and video :

You can add a section to your survey with any of these features.

Image, video are heavy . filesUsing may them slow down the file .transfer process

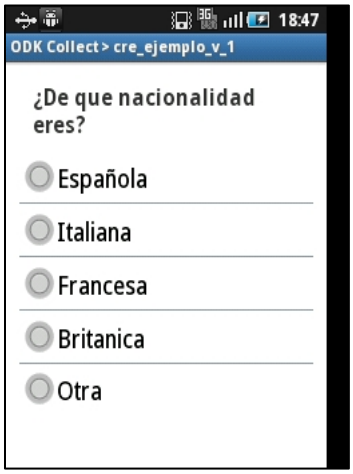
In a survey with 1,000 questionnaires, you'll quickly end up with files several GB in size if you add images!

Example: you can use this section to add a drawing to explain something, or take a photo of a building....

Signature:

By adding this section to your survey, you can obtain a signature directly on your smartphone screen.

In some contexts, it may be difficult obtain a signaturewritten . The advantage using such an option should be taken into account when designing the survey. It should also be noted that graphical data analysis is not possible (or very difficult).



Choose a question:

This is one of the basic question types. It works perfectly for "yes or no" question types! You can define the range of possible answers, but the answer must be only one.

For example: gender of beneficiary (male or female).

Multiple-choice :questions

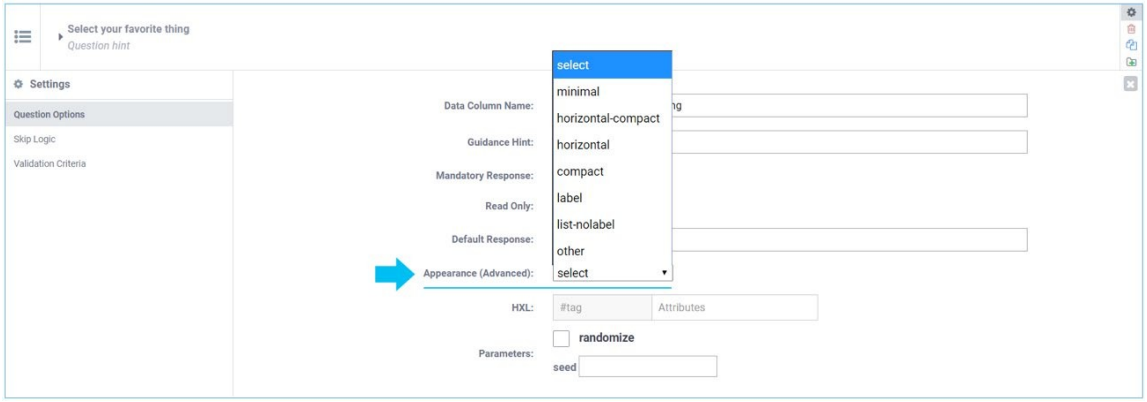
As in the previous type, you define the range of answerspossible , but in this , casethe answer can be more than one.

E.g.: which of the items in the distribution have you already used (tarpaulins, mosquito nets, kitchen utensils, etc.).

The answers to these questions can be difficult manipulate and analyze, so they should be used with care.

Question options

When a question is added there are options available for this question



Name

The name is the identifier question's .unique (ID)

This field is mandatory for all questions. Only letters, numbers and underscores are possible in this field. The field must begin with a letter or underscore. KoBoToolbox gives a default name (like "what's your age"), but it's always possible to change this default value (following the rules) to "ageage" or "".
" A01 ".

The name (ID) is important because it is the value used column headings in tables and sheets (Excel or other) once the data has been collected. If you want to follow a naming convention in your Excel sheet, you need to specify these names before deploying the form in your project. In the context of the dashboard, it is not possible (without havingto change the dashboard) to change any of the questions already integrated into the dashboard: it is possible, however, to add new questions (which will not appear in the dashboard but will be in kobotoolbox and in exports generated directly in kobotoolbox).

Tip (optional)

Tips are messages that will be displayed below the question in the form.

This is an optional field. It's often used to give additional instructions to interviewers. For example, if the question is "What is your age?" the tip might be "If the person doesn't know, enter 99".

Mandatory fields

If a question is "mandatory", the interviewer needs to give an answer in order to finalize the form.

Default (optional)

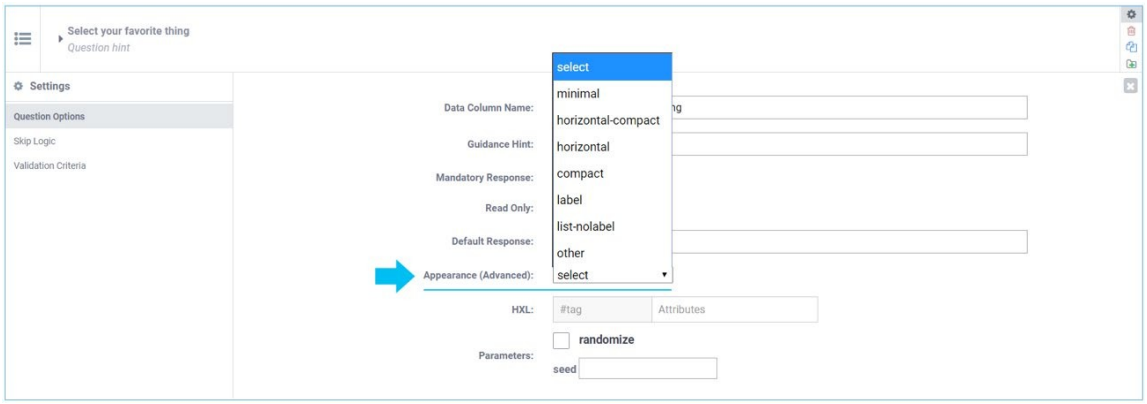
This field is used to specify an answer that the interviewer can accept or change.

In most cases it's not recommended to use this field, as it can create an accidental bias, but it can be interesting for dates or times.

Appearance (optional)

This advanced setting allows you display the question in a modified . waySome options are only available depending on the question type.

For a complete list of possible values, please refer to documentationthe Kobo .



Export and download datacollected

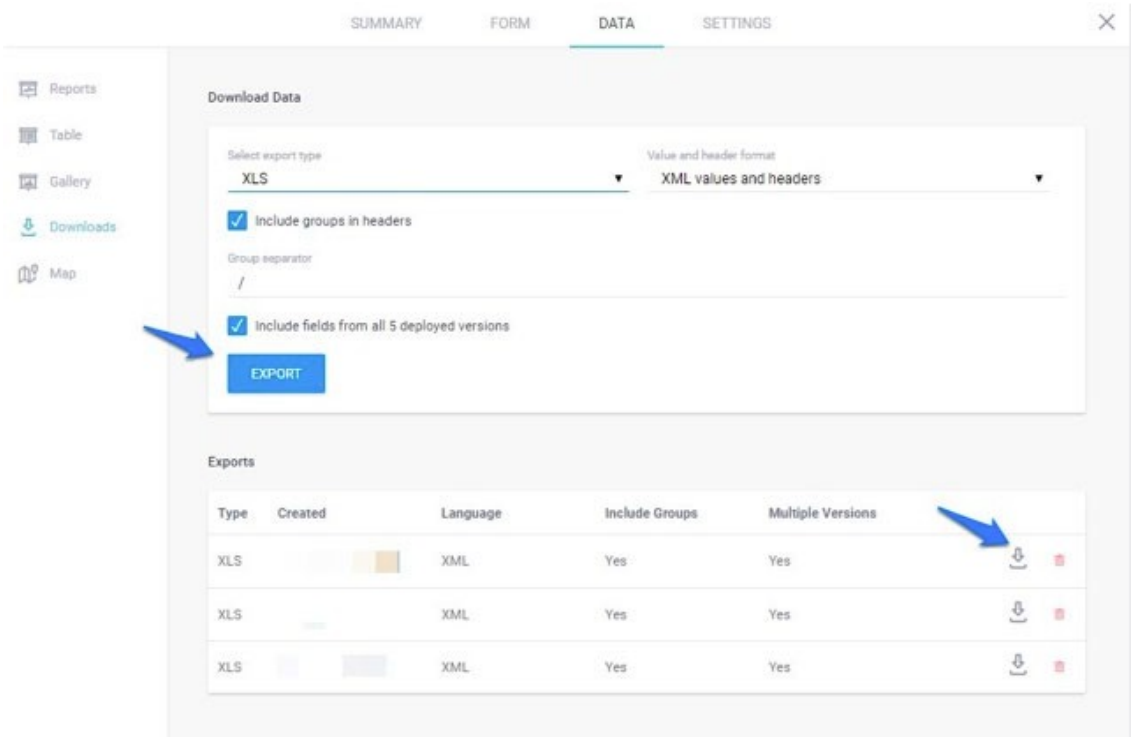
With KoboToolbox, it is always possible to retrieve stored data directly.

Data can be downloaded in several different formats as soon as it has been collected:

- XLS (formatted for an Excel)sheet
- CSV (columns separated by ",")
    - Media files (a zip directory of photos, videos or sounds - if applicable)
    - KML (a file with all GPS points - if applicable)

Once you've selected your data format and type, simply click on Export . buttonEach new export may take a few seconds to create and will appear in the Exports section of the page.

Each export is associated with a unique identifier in the system, so that it is always possible to retrieve a previous export that has not been deleted.



Exercise: KOBO questionnaire

Introduction

The situation is as follows:

• This part an NFI distribution, including Shelter elements: you make a global distribution in each village.

• FACT IM suggests the following questions. FACT IM awaits your approval before creating the questionnaire.

• You have a team of 4 volunteers (Marion, Aude, Xavier, Arturo)

You need to check whether each question is necessary and, if so, how to ask Example: we want

to know the "Department" of the beneficiary in France: 2 digits.it.
In Paris, the default value is 75 and we want it to be mandatory.

We need the following questions in the survey:

1. Survey start time
2. Survey end time
3. Name interviewer
4. Date
5. Device identifier
6. Village / Community
7. Priority needs: tarpaulins, shelter tool kit, hygiene kit, utensilskitchen , mosquito nets, school , feesconstruction , materialsseeds, food, other
8. Earned income / MONTH for a poor household (quantities in gourdes)
9. Are there things you need that you can't find on the market (that you can usually find at this time of year)? If the answer is yes, we need to know what.
10. Level of damage to house (no / small / heavy / destroyed)
11. Means to rebuild
12. HH ethnic group
13. Socio-economic vulnerability (chronic illness, disability, children or head of household, etc.)
14. We need the beneficiary's acknowledgement that we have sent him the questionnaire.
15. GPS point for community meeting place
16. HH language
17. Nationality of beneficiary
18. Number of family members: # men, # women, # elderly (over 65.)

CHAPTER 8: CURRENT Q&R

QUESTIONS FROM OWNERS

Q. Is my home safe?

R. Engineers' judgement at time of evaluation.

Q. Can I repair my house?

R. Repairs should be carried out in accordance with the small building repair guide produced by the MTPTC in October 2010.

R. Or find a qualified engineer.

Q What do the colors of the labels on the buildings mean?

R. Labeling a building is based on an assessment of the damage caused by an event.

- Green: building in no danger as a result of this event.
- Yellow: building with restricted use.
- Red: dangerous .building

Q. Does red labelling mean demolition?

R. A building labeled red does not mean demolish. Red means major , unsafe building in its current state.damage

Q. If my building is labelled green, is ?there no problem

R. A green building may have minor cracks in masonry walls or elementsreinforced . concrete It does not refer to performance in a future event.

QUESTIONS BETWEEN ENGINEERS

Q. Should a building's basement be considered a floor?

R. In such a case, the building should be considered as having 2 levels, one above and one below, and described as a 2/1 building. A "sunny" basement is characterized by a wall slope exposed to daylight, or when the upper part of the basement is above ground level.
A basement is any room or floor below the first floor.

Q. How should a building be viewed if most of its structure is covered in sheet metal?

R. In such a case, if the majority of the building is covered with sheet metal (more than 70 percent), the roof of the house must be considered as a light roof made of sheet .metal

Q. How should I view a penthouse apartment or a pergola?

R. A penthouse or pergola should not be considered as a storey valuing a building.

Q. How do you determine the inclination of a slope?

R. The inclination of a slope can be determined as follows:

- Gentle slope< 10%.
- Average slope 10%< X< 30%.
- Steep slope> 30%.

Q. Discussion on hammering

R. Insufficient space between two adjacent buildings that collide during a seismic .event

Q. Several buildings on one site (school, hospital, etc.)

R. If thereis one site, such as a school with several modules, the team must fill in a single for form the database of this facility, but each building must be assessed and labeled separately.

Q. Type of building to be considered as URM

R. 3 types of buildings can be considered as URMs

- Brick .buildings
- Rock masonry buildings and,
- Unreinforced or unconfined .block masonry buildings

NOTES

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