

Appendix 2

Instruction Manual



PERÚ

Ministerio
de Vivienda, Construcción
y Saneamiento

COURSE

AWARENESS – RAISING CONCERNING SAFER HOUSING AGAINST EARTHQUAKE

INSTRUCTOR MANUAL

Pueblo Nuevo, Chincha - 2008

This manual has been prepared by JICA STUDY TEAM and SENCICO with the technical and financial cooperation of the Government of Japan

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1. FUNCTIONS DEFINITION

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Tasks	Educative Supervisor	Construction Supervisor	Instructor	Assistant
Teaching methodology	●			
Training quality	●			
Theoric and practical evaluation			●	
Evaluation to the Instructor	●			
Verify the provision of teaching material: tools + instruments + equipment + construction materials (TIEC)	●			●
Verify educative material (textbooks)	●			
Pedagogic documents (evaluation register, memories, attendance control)			●	
Pedagogic documents (reports)	●			
Prepare course syllabus	●	●	●	
Prepare course chronogram	●	●	●	
Verify the fulfilment of course syllabus in lectures	●			
Verify the fulfilment of the correct execution of constructive process and minimum requirements application.		●	●	

INSTRUCTOR MANUAL

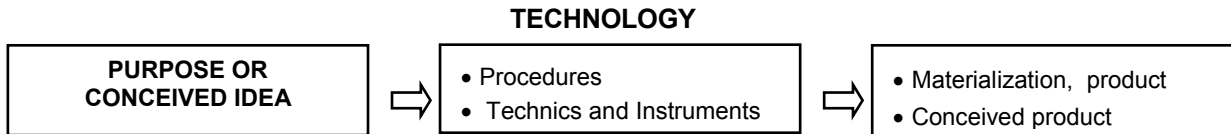
Tasks	Educative Supervisor	Construction Supervisor	Instructor	Assistant
Approve quality and quantity of construction materials for the training course	●	●	●	
Verify security in construction site		●	●	
Check and verification of warehouse correct installation	●			
Report to JICA Study Team on progress and fulfillment of course objectives	●			
Prepare final report	●	●	●	
Verify allowance payment and trainees control	●		●	
Guide and delegate construction materials buying for the training course	●			
Teach course theory making incidence on minimum requirements			●	
Teach course practices			●	●
Define security requirements in site construction (personal security implements)	●	●	●	●
Report to course Supervisor on progress and fulfillment of course objectives			●	
Control of participants attendance			●	●
Technical assistance for course trainees in the development of the practical part of the course.				●

2. TEACHING METHODOLOGY

1. EDUCATIVE TECHNOLOGY

CONCEPT.- Technology is etymologically defined as the set of knowledge, mechanisms and procedures of a determined activity, that coincides with a profession and or a skill.

So, production technology is a set of procedures, techniques and instruments with which it could be in fact materialized in the reality a good (artifact or product) or a process that has been conceived.



In short, technology is understood as science application in its several fields, technology is linked to the man practical dimension.

It appears like: mechanical technology, agricultural technology, construction technology, etc.

From the above mentioned, it is deduced that Educational Technology is:

SET OF PROCEDURES, TECHNIQUES AND INSTRUMENTS USED FOR MAKING REAL AN EDUCATIONAL CONCEPTION.

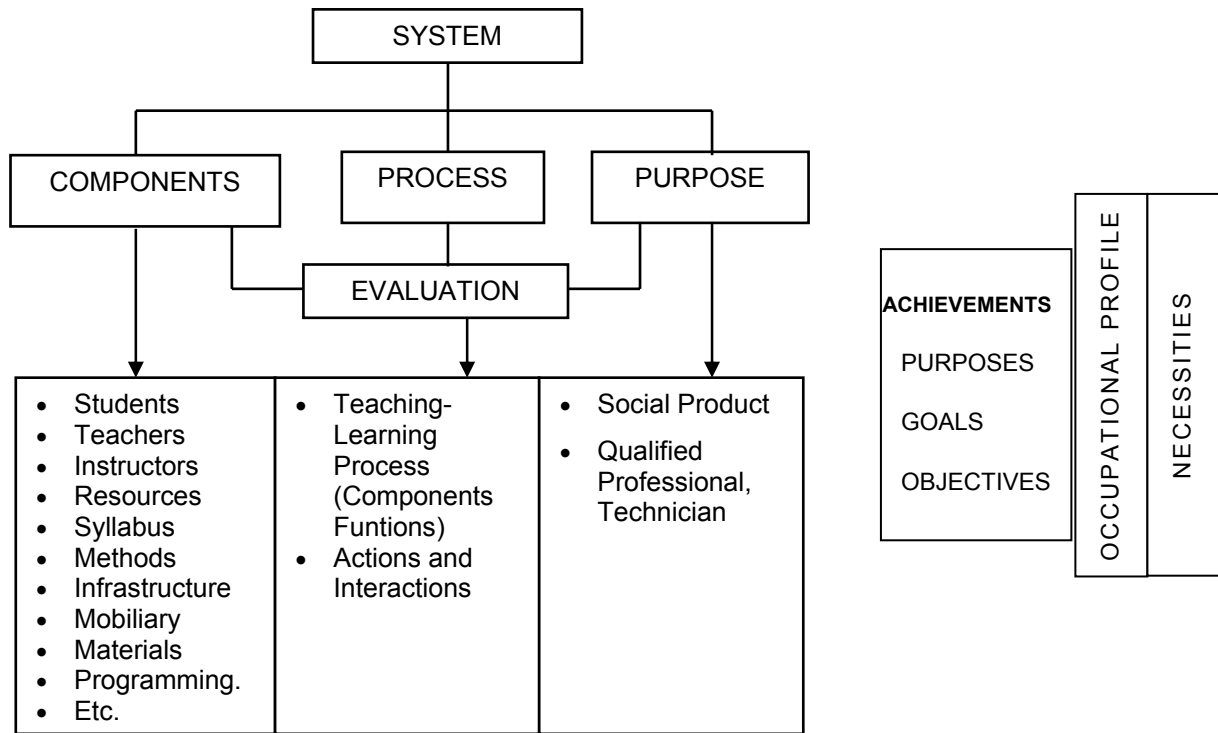
Educative Technology has been asserted several meanings, like:

1. **As teaching helpings:** Machines and audiovisuals media (hardware point of view) Instrumentation.
2. **As learning helpings:** learning programs prepared as application products of the programmed instruction (psychological viewpoint).
3. **As a systematic view:** Process Technology or Teaching-Learning System Analysis

Educational Technology as "**Systematic View**" refers to a new philosophy that considers the only significative way to perceive the organization is when it is studied as a system.

The systematic view or systems analysis is to perceive it as a whole compounded with different elements or components that interact among them to reach or make real a group of objectives; every system element plays a roll, contributing to achieve the objectives and when some component of this field is going to be studied, it will be done in relation to the system it belongs.

Every system has a purpose, that in our case is oriented to get the Occupational Profile that describes a set of characteristics or qualities that identify it as its "social product" and that determines the knowledge it should have, the functions it is able to do and the attitudes it should have during the performance of a task.



The Educative System is part of another system, which is the Society, and between both mutual interrelationships occurs.

SOCIETY



Educative Technology fundamental objective is to optimize the educational actions to achieve efficiently the system objectives. This won't be achieved if only the system mechanized physical element is emphasized, that is teaching helpings or only the learning programs or helpings. Every technology should prescribe, through a rules System, optimized action ways that permit achieve the total objectives of the system.

COMPONENTS

Components of the Educative Technology, understood within the "System Viewpoint", necessarily begin in the educative conception itself, that in the Professional Formation is linked to the Occupational Profile and it is from this Occupational Profile that the syllabus is design as an instrument in the materialization process of the educative conception, that is, between the syllabus and educative conception there is a relationship of means and purpose.

Educative Technology has several levels that in logic order, according to their internal connections, are:

- The educative conception of Occupational Profile
- The syllabus with the curricular plan, didactic units, and learning sessions
- The educative strategy that involves methods, techniques and educational procedures
- Auxiliary instruments or didactic materials
- Evaluation of trainee and of the process.

Curriculum.- It is the first Educative Technology component or level that implies the first penetration in the world of reality from the educative conception world. It is the first component of the Basic or Generic Curricular Plan that has to be organized in curricular blocks or didactic units in second or third instances or levels, reaching in this way to the learning session or Lesson Plan in which the Teacher or Instructor selects, orders and grades the learning experiences, that are going to be useful for participants and students to obtain the operational or educational specific objectives.

The learning Strategy or Educative Methodology.- In this Educative Technology it is determined *How all the curriculum will reach to the student* to become in them live experiences that form the characteristics or qualities of the educative conception or of the occupational profile, in what the student should know, do and be (attitudes) toward the required performance of a job position.

Teaching methodology is related to the didactic that the teacher should employ to make the learning effective. Methods, techniques and procedures for knowledge and abilities transfer in the educative process are adequate through the strategy determination that in its application make easier the achievement of the educational objectives.

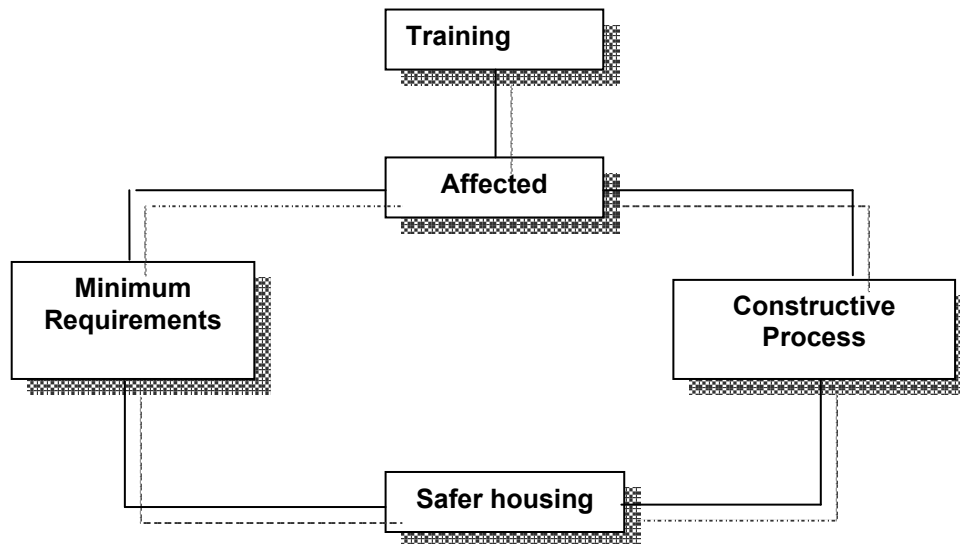
Auxiliary instruments.- They are educative process means and materials that coadjuvate to the teacher effort in the process effectively, complementing the action itself and improving the acquisition and retention by the use of senses and in the facts objectification in order that the learning vivencies be the nearest to reality. That is, they are material resources used by teacher to stimulate the learning of experiences considered in the curriculum contents.

Evaluation.- With evaluation we can check:

- a. First, if the students have really passed through the experiences that were considered desirable and that have been brought nearer to curricular goals, that is to say that allow to verify the learning, through the assessment of the dominion degree of the curriculum objectives.
- b. Second, it is verified if the learning system or strategy is efficient; If the auxiliary instruments correspond to its aims; if the curricular blocks (didactic units up to lesson plan) allow effectively perform the curriculum; and if the curriculum really guides to the educative conception ideals; that is the evaluation permits verify the efficacy of the components that intervenes in the teaching – learning process, as well as of the techniques or instruments of the evaluation itself that are indispensable to feedback and readjust the system.

2. TRAINING SYSTEM

It is a strategy that is going to allow the participant to have the necessary knowledge to practice a determined occupation.



3.0 CURRICULAR PROGRAM

**“It is more worthy to do the adequate thing than to do things adequately”
(Peter Drucker)**

3.1 GENERALITIES

One of the main functions of trainer is planning and programming of the educative action. For developing the course programming it should be know, analyze and decide:

At technique level:

- Formative action adequation to social surrounding, specifically to the productive system demand.
- Qualification or professional competence level required by the occupation: specialization, polyvalence, future tendencies.
- Formative program purpose
- Competencies itself: technical and didactics
- The start level of human resources that are going to participate in the formative action.
- Teaching – learning methods
- The system with which is going to control the program adequation to the market labor demand

At execution level or teaching practice:

- Learning objectives
- Students entrance profile
- Selection, structuralization and systemation of learning contents and activities
- Available and necessary methodology and pedagogic resources
- Program duration; formative spaces;
- How to evaluate the teaching - learning process, the reach of learning objectives and the course results.

a. How are formation needs corresponded?

In professional formation we train people for productive world, that is why the job world is who give us orientations and professional profile or the qualification a person should have to produce and be useful to one self and to society.

Program contents, that finally will train for professional exercise, are based in knowledge, analysis, and valuation of technique and related competencies that require the job; so, the following questions have to be carefully studied:

- | | | |
|------------------|---|---|
| What to teach? | ⇒ | Job contents |
| To what level? | ⇒ | Worker characteristics |
| For what? | ⇒ | Learning objective |
| In what context? | ⇒ | Labor surround – technologic-social cultural; cooperation with economic development |

b. Programming principles

Trainer is in a determined position in the general context of plans and formation programs: on one side it should attend to policies, goals and global strategies of training of the country, institution or company where trainer develops his activity.

On the other side, trainer should participate in the participate in the elaboration, redesign and definition of the program that is going to apply with a type of population and a concrete purpose. This is our case so we have to analyze it.

c. Values that inform about program elaboration

When we elaborate our formation program, we will answer a question series.

d. Formation needs analysis

In order to structure logically and sequentially the learning contents that the job or occupation demands, we should initially answer two questions when we study formation needs:

What formation is needed? = What is learnt?



Job profile

Who needs formation? = Who learns?

For that we should consider:



Student / worker profile

Productive sector

- Technologic evolution. Technologic transfer
- Qualification required by the sector (competencies)
- Sector future tendencies at short and médium term.
- Labor market: job and formation offer and demand.
- Occupation future tendencies: New occupations and labor market movility

Job positions

- Responsibilities, functions and tasks
- Instruments, technology
- Interrelation of job position inside the same occupation or productive area.

Job analysis

Job analysis permit us to answer questions like: What does the worker do? How he /she does; Why or what for?; what exigencies needs the job?, what means and technology do they use?

In consequence, the following questions should be answered to understand job purpose:

What is it done?	➡	Why?; Is it necessary?
Where is it done?	➡	Why here?; What inconvenient has?;
		Why not in another place?;
When is it done?	➡	Why in this moment?;
		Could it be done in other moment?
Who does do?	➡	Why this person?

3.2 INSTRUCTIONAL OBJECTIVES

One of the main problems that we face when knowledge and abilities have to be transmitted is the communication lack between students and teachers. Many times, teachers have “in mind” broad purposes for the learning of their students when they develop activities in the lecture room. However, students are frequently in disadvantage because they don’t know what is expected they can be able to do or know after the teaching unit is over.

And, without knowing what is expected they can be able to do, students practice the “riddle game”. Only those who “foretell” with precision what is expected they can be able to do after the instruction is over, get good results.

It is important that the student knows what the teacher expects from him, because in that way the teacher can orient their efforts with a maximum yield.

At the same time, it is important that teacher identifies the learning results he /she pretends that his/her students reach in terms of instructional objectives.

INSTRUCTIONAL OBJECTIVES are useful for students because they establish a clear direction by communicating to them exactly what the students should be able to do after a determined instructional sequence.

On the other hand, the

INSTRUCTIONAL OBJECTIVES are useful for teacher because they give him a secure direction for planning, implementing and evaluation of an instruction.

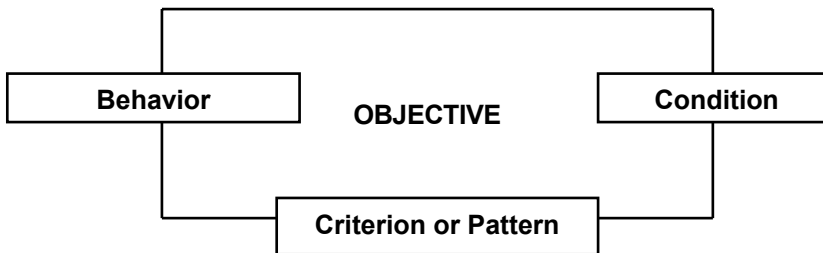
The study on instructional objectives should begin with an answer to the following question:

What is an **OBJECTIVE**?

It is a description of what the student is expected to be able to do (perform, understand), after an instructional sequence.

According to Robert Mager, a clear, precise and explicit instructional objective should include three components:

BEHAVIOR - CONDITION - CRITERION OR PATTERN



Each element will be examined individually:

BEHAVIOR.- An instructional objective should specify with exactness what the student should be able to do.

Behavior describes the action that it is expected from the student after an instructional sequence. It should be:

- Directly observable (visible)
- Directly measurable (tangible)

When the expected behavior is **observable** it is also called **open** behavior

Examples of open behaviors:

- | | |
|-----------|-------------|
| · Write | · Draw |
| · Prepare | · Mark |
| · Name | · Build |
| · List | · Point out |

When the behavior that we expect from the student **isn't observable**, because is mental, cognitive, or intern, it is called **cover** behavior

In this case, Robert Mager suggest that in the objective it should be included an **INDICATOR BEHAVIOR**, transforming it in a observable behavior.

Examples:

COVER BEHAVIOR

- To Addition
- To Identify
- To Recognize
- To Distinguish
- To Name
- To Enunciate
- To Create
- To Formulate
- To Resolve

INDICATOR BEHAVIOR

- (Writing)
- (marking, pointing out, circumscribing)
- (marking, pointing out, separating)
- (pointing out, separating)
- (writing, listing)
- (writing, talking)
- (writing)
- (writing)
- (writing)

Behavior is always presented by a verb in infinitive.

In this way, when behavior is cover, we need a behavior indicator. The verb will be presented also in infinitive tense, while the behavior indicator will be presented between parenthesis and in gerund.

Example:

- The student will be able **to identify** (*pointing out*) the beating tools.

Pointing out is a behavior indicator that makes the behavior to be open, specifying how the student should perform it, and that it could be observed.

In this way, the definition of an objective with cover behavior will be like:

- The student will be able **to recognize (writing)** the characteristics that refer to a bench vise.

CONDITION.- With the purpose of being clear and especific, an instructional object should include the conditions under which the behavior should occur.

It should explain the conditions that will be imposed when the student is demonstrating skilful in the objective.

Example: Given a geometric figures series, the student will be able **to identify (pointing out)** a rectangle.

GIVEN A GEOMETRIC FIGURE SERIES

These are the conditions under which the behavior should occur.

These conditions specify information and references types that the student can or can not consult or use with the purpose of "to identify" (*pointing out*) a rectangle.

For a better understanding, let's see some examples:

- Showed a characteristic list.
- Without the help of technical terms dictionary.
- With the use of a measurement instrument.
- Given a table with figures.
- Without the use of tools.
- When a calculator is presented.

The **CONDITION** can especify:

What will the student be allowed or denied to use (instruments or means that the student can or can not use in order to fulfill with the objectives demands)

So, the enunciate of an **OBJECTIVE** with condition and behavior will be like:

- Given a list of characteristics, the student will be able **to recognize (writing)** those that refer to bench vise.
- In a written test, without consult, the student will be able **to enunciate (writing)** the parts name of a plumb.

CRITERION OR PATTERN.- To be clear and specific, an instructional objective should also include the criterion or minimum PATTERN of satisfactory pattern that allow evaluate and determine if the objective was reached.

Example:

Presented five different color objects (yellow, red, green, blue, White) the student will be able to mention the colors of each one of the five objects.

The minimum pattern of satisfactory behavior is to reach the five objectives. In this objective, any error is not accepted.

The criterion can be observe don three different aspects:

- Behavior velocity: It is the time limit in which the behavior should occur.
Example: In a period of 20 seconds
 In 15 minutes as maximum
- Behavior exactness: It is the errors (success) allowed (or demanded) in relationwith a determined behavior:
Example:
 - Nine correct answers
 - Without error
 - All the answers are correct
- Behavior Quality: It is the acceptable precision degree in a determined behavior.
Examples: Consider correct all the answers that are exact until the third figure.
 Acceptable precision in the balance use will be of the plus or minus one miligram.

In this way, the enunciate of an objective with condition, behavior and criterion or pattern will be like:

Presented a characteristic list, the student will be able to recognize (writing) those that refer to bench vise.

Pattern: In five minutes as maximum.

3.3 LESSON PLAN

1. **DEFINITION:-** ACTUATION PLAN is a document prepared before a learning session. It is elaborated by the teacher. It refers to how to conduct or execute, within an assigned time, a learning session on

basis to an analytical Program, to achieve in an effective, order and sequential way the development of a Modular Unit, subject, task, or operation, it is in consequence a written sheet or guide that prepares the instructor for the following of his teaching job in the foreseen time in a planned way.

Learning experience materialization is in the Actuation Plan

Actuation Plan is formed of the following parts:

- ❑ Didactic Unit or Task Number and learning session Number
- ❑ Teacher name and date
- ❑ Job: The matters of the analytical Program subject content that are going to be developed during the learning session are annotated here.
- ❑ Objectives: The objectives that should be reached at the end of a learning session will be annotated here: Here, the parts that have to be developed for making effective the teaching-learning process are considered. There are four essential parts:
 1. **Participant Preparation:** The main purpose in this stage is to obtain that the participant wish to learn, this is, to wake up their learning interest or necessity. Here the location, references for remembering have to be annotated: I will writ on the blackboard the subjects to be taught, will make a relationship with something previously learnt, will make questions to know about how much do they know about what they are going to study, , and it will be indicated the name of the motivation theme, as well as how the visual aids are going to be presented to give a global idea of what it is going to deal.
 2. **Presentation by the teacher:** It includes knowledge and manipulative abilities, according to the cases, that is to say if it is about a theoretic lesson or practice lesson or both at the same time. Annotations of this part are made in two areas.

On the left side: tasks instructions (matter to deal) are annotated in case of a theoretic study, and operation and its steps are annotated in case of a practical study.

On the right side: things that is necessary to remember, say or do and that have relation with the matter written on the left side are annotated in case of theoretic case, while in the case of a practical case, key points and precautions corresponding to the step annotated on left side.
 3. **Application by the Participants:** In case of theoretic case, the application exercises and reinforcement questions are annotated. In case of practical study, the individual conformation or group conformation of the application and the points to observe and reinforcement questions.
 4. **Evaluation:** Questions or the evaluation instrument that will be used to verify participants achievements of the proposed objectives according to the conditions, behavior and criterion.

The elaboration of the Actuation Plan should follow the order detailed on the scheme that follows the example that appears in the methodological guidance for modular training.

3. CURRICULAR PROGRAM

INSTRUCTOR MANUAL

SENCICO		Learning Unit: Drawing Reading		Competence Unit
Professional Formation Management	Capacity: Drawing reading, according to task sheet, applying technological knowledge and respective procedures			
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Scales 	<p>Generalities:</p> <ul style="list-style-type: none"> ▪ Training course presentation: Purpose and objectives, content and daily schedule ▪ Basic definitions of foundation, tie beam, walls, and structures ▪ Scales: types and symbols ▪ Understanding the learnt ▪ Graphic elements of the drawing expression <ul style="list-style-type: none"> ▪ Practical execution: Drawings reading 	4:00	<ul style="list-style-type: none"> ▪ Theme exposition: Using the drawings ▪ Ask and verify trainee comprehension ▪ Practice: reading and understanding the learnt 	<ul style="list-style-type: none"> - Drawings - Scale ruler - Metallic measuring tape
Total time (hr.): 20 h				

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Foundation tracing			Competence Unit
Professional Formation Management	Capacity: Foundation tracing, according to task sheet, applying technological knowledge and respective procedures			N°2
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Land cleaning • Determine level • Measuring and marking • Trig beacon installation • Axis and foundation tracing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Foundations: functions, types, concrete mix to use ▪ Procedures for marking and measuring ▪ Determine level: Importance ▪ Trig beacon: Concepts and uses. Position and characteristics. ▪ Trig beacon leveling and plumbing ▪ Tracing axis and alignments: purpose and procedures <p>Applied Math:</p> <ul style="list-style-type: none"> ▪ Lineal, surface and volume units. Area calculation according to housing prototype <p>Drawings Reading:</p> <ul style="list-style-type: none"> ▪ Foundation drawings and technical specifications ▪ Location of foundation and columns axis <p>Materials and tool technologies</p> <ul style="list-style-type: none"> ▪ Description, types, uses and conservation of tools, instruments and equipment used for foundation tracing ▪ Description, characteristics, types, dimensions and uses of materials used for foundation tracing. Storage and commercialization ways <p>Hygiene and security on site</p> <ul style="list-style-type: none"> ▪ Risk prevention in foundation tracing <p>Application practice</p> <ul style="list-style-type: none"> ▪ Foundation tracing in bricks made with bricks ▪ Land cleaning ▪ Level determination ▪ Measuring and marking ▪ Place trig beacons according to drawing ▪ Axis and foundation tracing 	<p>8:00</p>	<ul style="list-style-type: none"> ▪ Explain foundation function ▪ Show tool, instruments, and equipment for founding tracing ▪ Show the house foundation drawing ▪ Practice: work in pair tracing axis for foundation, according to Instructor indications 	<ul style="list-style-type: none"> - Wire N° 16 - boots - Helmet - Hand level - Wire cutter - Nails - large hammer - Cord - sketch - rake - broom - Stakes (iron, wood) - Leather gloves - Pencil - Hammer - Bubble level - Plumb - Ruler - Hook - Metallic measuring tape
		<p>16:00</p>		

INSTRUCTOR MANUAL

Total time (hr.): 18 h

SENCICO	Learning Unit: Ditch Excavation			Competence Unit
Professional Formation Management	Capacity: Ditch excavation, according to task sheet, applying technological knowledge and respective procedures			N°3
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Ditch making • Ditch finishing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Ditch: minimum length and width for a seismic-resistant house ▪ Ditch making purpose ▪ Ditch finishing: Importance ▪ Minimum requirements (2.0, 2.1) <p>Drawings Reading:</p> <ul style="list-style-type: none"> ▪ Ditch depth drawings and technical specifications (Minimum requirements) <p>Materials and tool technologies</p> <ul style="list-style-type: none"> ▪ Description, types, uses and conservation of tools, instruments and equipment used for ditch excavation ▪ Description, characteristics, types, dimensions and uses of materials used for ditch excavation. Storage and commercialization ways <p>Hygiene and security on site</p> <ul style="list-style-type: none"> ▪ Risk prevention in ditch excavation and finishing <p>Application practice</p> <ul style="list-style-type: none"> ▪ Ditch making ▪ Ditch finishing 	<p>2:00</p>	<ul style="list-style-type: none"> ▪ Explanation and demonstration ▪ Apply written test ▪ Reading and comments of SENCICO and makers leaflet ▪ Practice: work individually. Comment about technical specifications on a given drawing ▪ Apply evaluation 	<ul style="list-style-type: none"> - Shovel - Steel bar - boots - Helmet - Hand level - Pick - Cord - sketch - buggy - Metallic measuring tape
Total time (hr.): 10 h		8:00		

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Framework making for columns			Competence Unit
Professional Formation Management Operation	Capacity: Framework making for columns, according to task sheet, applying technological knowledge and respective procedures			N°4
<ul style="list-style-type: none"> • Mark and measuring • Wire cutting • Steel bar cutting • Steel bar bending • Mark and distribution of hoops • Plumb lining • Fix framework 	<p>Content</p> <p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Column: function ▪ Prepare steel bars: purpose and procedures. Elements. Steel distribution in confined masonry. ▪ Hoops, anchors, and spacers. Function and distribution ▪ Frame work: definition, characteristics and specifications ▪ Minimum requirements (2.0, 2.2, 3.0, 3.1, 3.3) <p>Applied Mathematics:</p> <ul style="list-style-type: none"> ▪ International System of Units. Longitude units <p>Drawing reading</p> <p>Column drawings and technical specifications</p> <p>Materials and tool technologies</p> <ul style="list-style-type: none"> ▪ Description, types, uses and conservation of tools, instruments and equipment used to make column framework ▪ Description, characteristics, types, dimensions and uses of materials used to make column framework <p>Hygiene and security on site</p> <ul style="list-style-type: none"> ▪ Risk prevention in column framework making and fixing <p>Application practice</p> <ul style="list-style-type: none"> ▪ Wire, steel cut ▪ Steel bending ▪ Mark and distribution of hoops ▪ Plumb lining ▪ Prepare framework ▪ Framework fixing 	<p>Length</p> <p>7:00</p>	<p>Methodology</p> <ul style="list-style-type: none"> ▪ Column function explain ▪ Hoops criteria and importance of distribution ▪ Show sketch and drawings ▪ Organize groups to make column frameworks 	<p>Didactic material</p> <ul style="list-style-type: none"> - wire n° 16 - Steel preparation table - chisels - saw for metals - Metal cutter - Small concrete blocks - Safety eyeglass - Gloves - Hammer - Metallic measuring tape - Hook - Iron pipe - Metallic measuring tape
<p>Total time (hr.): 22 h</p>				

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Foundation Building			Competence Unit
Professional Formation Management	Capacity: Foundation Building, according to task sheet, applying technological knowledge and respective procedures			N°5
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Concrete Preparation • Concrete pouring 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Purpose of concrete mix preparation ▪ Purpose of concrete mix pouring ▪ Concrete: concept, proportion and mixing ▪ Concrete transport and pouring in the construction site ▪ Minimum requirements (1.0, 1.3(a) 2.0, 2.2(a)) <p>▪ Applied Mathematics:</p> <ul style="list-style-type: none"> ▪ Basic operations with round numbers and decimals <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Technical specifications interpretation <p>Tools, Instruments, Equipment and Construction materials (TIEC) Technology</p> <ul style="list-style-type: none"> ▪ Components: cement, aggregates, water ▪ Description, types, uses and keeping of Tools, instruments, equipments and materials <p>Hygiene and security on site</p> <ul style="list-style-type: none"> ▪ Precautions for concrete preparation ▪ Description of the operation: <ul style="list-style-type: none"> ○ Prepare concrete ○ Concrete pouring <p>Application practice</p> <ul style="list-style-type: none"> ▪ Prepare concrete ▪ Concrete pouring 	<p>2:00</p>	<ul style="list-style-type: none"> ▪ Show the concrete ▪ Indicate the transport form to the construction site ▪ Verify the security rules fulfillment in transport and install of concrete on construction site, and in the use of concrete pouring machines ▪ Reading and comments of SENCICO and makers leaflets ▪ Individual practice, preparing and mixing the concrete according to an indicated proportion ▪ Apply a written test 	<ul style="list-style-type: none"> - Cement - Sand - Water - Crushed stone - Hormigon - Shovel - Pick - Buggy - Mixer
Total time (hr.): 10 h				

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Framework making for RC tie beam			Competence Unit
Professional Formation Management	Capacity: Framework making for RC tie beams, according to task sheet, applying technological knowledge and respective procedures			N°6
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Measure and mark • Wire cutting • Steel cutting • Steel bending • Mark and distribution of Stirrups • Plumb lining • Framework fixing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Purpose of steel alignment ▪ Purpose of steel tying ▪ Cover ▪ Function of the anchors ▪ Minimum requirements (2.0, 2.2(b)) <p>TIEC Technology</p> <p>Description, types, uses and conservation of hook, leather gloves, safety eyeglass</p> <p>Drawing reading</p> <p>Column drawings and technical specifications</p> <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Security rules in the work with steel ▪ Precautions when steel is being tie <p>Application practice</p> <ul style="list-style-type: none"> ▪ Steel alignment ▪ Steel tying 	<p>6:00</p>	<ul style="list-style-type: none"> ▪ Column function explanation ▪ Stirrups distribution criteria and importance ▪ Organize groups for steel alignment and tying 	<ul style="list-style-type: none"> - wire n° 16 - Steel preparation table - chisels - Trestles - Metal cutter - Small concrete blocks - Safety eyeglass - Gloves - Hammer - Metallic measuring tape - Tortol - Iron Pipe
Total time (hr.): 20 h				

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Tie beam building			Competence Unit
Professional Formation Management	Capacity: Building of tie beam, according to task sheet, applying technological knowledge and respective procedures			N°8
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Measuring and mark • Tie beam tracing • Prepare formwork elements • Formwork assembling and fixing • Concrete preparation • Concrete pouring and homogenating • Taken out the Formwork and curing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Tie beam: Concept, function and types. Tracing techniques ▪ Formworks: Concept functions and types. Elements ▪ Cut, plane techniques for wood ▪ Nailing, hooking, leveling, plumb lining and securing of wood formworks ▪ Concrete proportions for tie beams ▪ Concrete pouring and homogenizing in tie beams. Procedure ▪ Taking the formwork out and tie beam curing: procedure and times ▪ Formworks elements storage ▪ Minimum requirements (1.0, 1.2(a,b,c,d)) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Longitude, area and volume units <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Formworks drawings , structures details and technical specifications <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Wood for formwork: description, types, selections and uses. Usual units and commercialization mode. Storage. Wood drying ▪ Description, types, uses. and conservation of tools, instruments and equipment for tie beam. <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Risk prevention in preparation, pouring and homogenizing of tie beams <p>Application practice</p> <ul style="list-style-type: none"> ▪ Tie beam building: <ul style="list-style-type: none"> ○ Tie beam tracing according to technical specifications ○ Prepare elements for formworks ○ Assemble and fix tie beam formwork ○ Concrete preparation and pouring in tie beam ○ Taking out the formwork and tie beam curing 	2:00	<ul style="list-style-type: none"> ▪ Tie beamfunction explanation ▪ Formworks and its elements function explanation ▪ Show woods for formworks 	<ul style="list-style-type: none"> - wire n° 16 - Water - Aggregates - Cement - Plane - Nails - Concrete can - Wood for formwork - hammer - Ochre - Saw - Hook - Metallic measure tape
		8:00		

INSTRUCTOR MANUAL

Total time (hr.): 10 h		Learning Unit: Tie beam building		Competence Unit
SENCICO		Capacity: Building of tie beam, according to task sheet, applying technological knowledge and respective procedures		N°8
Professional Formation Management	Operation	Content	Length	Methodology
<ul style="list-style-type: none"> • Measuring and mark • Tie beam tracing • Prepare formwork elements • Formwork assembling and fixing • Concrete preparation • Concrete pouring and homogenating • Taken out the Formwork and curing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Tie beam: Concept, function and types. Tracing techniques ▪ Formworks: Concept functions and types. Elements ▪ Cut, plane techniques for wood ▪ Nailing, hooking, leveling, plumb lining and securing of wood formworks ▪ Concrete proportions for tie beams ▪ Concrete pouring and homogenizing in tie beams. Procedure ▪ Taking the formwork out and tie beam curing: procedure and times ▪ Formworks elements storage ▪ Minimum requirements (1.0, 1.2(a,b,c,d)) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Longitude, area and volume units <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Formworks drawings , structures details and technical specifications <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Wood for formwork: description, types, selections and uses. Usual units and commercialization mode. Storage. Wood drying ▪ Description, types, uses. and conservation of tools, instruments and equipment for tie beam. <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Risk prevention in preparation, pouring and homogenizing of tie beams <p>Application practice</p> <ul style="list-style-type: none"> ▪ Tie beam building: <ul style="list-style-type: none"> ○ Tie beam tracing according to technical specifications ○ Prepare elements for formworks ○ Assemble and fix tie beam formwork ○ Concrete preparation and pouring in tie beam ○ Taking out the formwork and tie beam curing 	<p>2:00</p>	<ul style="list-style-type: none"> ▪ Tie beamfunction explanation ▪ Formworks and its elements function explanation ▪ Show woods for formworks 	<p>Didactic material</p> <ul style="list-style-type: none"> - wire n° 16 - Water - Aggregates - Cement - Plane - Nails - Concrete can - Wood for formwork - hammer - Ochre - Saw - Hook - Metallic measure tape
			8:00	

INSTRUCTOR MANUAL

Total time (hr.): 10 h		Learning Unit: Making wall template		Competence Unit	
SENCICO		Capacity: Making wall template, according to task sheet, applying technological knowledge and respective procedures		N°9	
Professional Formation Management		Length		Methodology	
Operation		7:00		<ul style="list-style-type: none"> ▪ Explaining wall template techniques and brick tie ▪ Explaining brick cutting techniques ▪ Explaining vertical brick layer distribution ruler preparation procedure ▪ Show tools, instruments and equipments for making wall template ▪ Describe criteria for pipes installation 	
<ul style="list-style-type: none"> • Measuring and mark • Brick distribution • Brick cutting • Alignment • Prepare vertical brick layer distribution ruler 		<p>Content</p> <p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Walls: Concept ▪ Template technique: Concept and purpose ▪ Brick cutting: purpose, procedures ▪ Distribution: brick tie, brick union ▪ Layers Escantillon: description, types and uses ▪ Minimum requirements (1.0, 1.5(a) – 3.0, 3.4) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Materials Calculation <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Housing architectural drawings, details <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Brick: Description, types and uses. More frequent dimensions ▪ Description, types, uses, and conservation of tools, instruments and equipment for making wall template. <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Precautions in use of tools and instruments for making wall template <p>Application practice</p> <ul style="list-style-type: none"> ▪ Distributing and alignment of bricks ▪ Brick cutting according requirement ▪ Prepare vertical brick layer distribution ruler 		<p>Didactic material</p> <ul style="list-style-type: none"> - Brick - Helmet - Chisels - Cord - Square set - safety eyeglass - Carpenter pen - Lumber - Plumb lining - Wood spacer - Metallic measure tape 	
Total time (hr.): 27:00 h		20:00			

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Wall building			Competence Unit
Professional Formation Management	Capacity: Wall building, according to task sheet, applying technological knowledge and respective procedures			N°10
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Level determination • Measuring and mark • Brick distribution • Brick cutting • Install electric installations pipes • Brick alignment • Mortar preparation • Brick installation 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Cleaning register: Purpose and preparation ways ▪ Mortar: Definition, characteristics, mortar preparation procedure ▪ Brick installation procedure ▪ Pipes and electric box installation ▪ Minimum requirements (1.0, 1.2(a), 1.5(b), 1.3(a) – 2.0, 2.2(b)) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Area and volume Calculation ▪ Proportions for mortar preparation <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Housing architect and structure drawings ▪ Wall symbolization <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Mortar components: concepts, types and applications of cement, aggregates and water ▪ Description, types, uses, and conservation of tools, instruments and equipment for wall building. <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Precautions in use of tools and instruments for wall building <p>Application practice</p> <ul style="list-style-type: none"> ▪ Wall building <ul style="list-style-type: none"> ○ Prepare cleaning register, according to indications ○ Prepare mortar ○ Install bricks ○ Install reinforcement steel in vanes ○ Install pipes in brick perforation ○ Install electric installation boxes 	<p>7:00</p>	<ul style="list-style-type: none"> ▪ Explain the purpose of cleaning register preparation ▪ Explain reinforcement functions and location criteria ▪ Explain importance of wall reinforcement ▪ Show drawings that indicate location of reinforcement and installations 	<ul style="list-style-type: none"> - Water - Brick - Sand - Helmet - Buggy - Chisels - Cord - Square set - safety eyeglass - Carpenter pen - cement - Plumb lining - Wood spacer - Metallic measure - tape - Brick layer - vertical ruler - Shovel
Total time (hr.): 27:00 h		<p>20:00</p>		

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Making formwork and pouring concrete in columns			Competence Unit
Professional Formation Management	Capacity: Making formwork and pouring concrete in columns, according to task sheet, applying technological knowledge and respective procedures			N°11
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Level determination • Measuring and mark • Saw by hand • Nailing and perforating • Dormant fixing • Fixing pointdrill • Install board • Plumb lining • Concrete preparation • Concrete pouring and homogenizing • Taking out the Formwork and curing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Column: Concept ▪ Formworks: Concept functions and types. Elements ▪ Minimum requirements (1.0, 1.1(a,b,c,d)) - 2.0, 2.3) <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Housing architect and structure drawings ▪ Column symbolization <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Concrete components: concepts, types and applications of cement, aggregates and water ▪ Description, types, uses. and conservation of tools, instruments and equipment for column formwork and concrete pouring <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Precautions in use of tools and instruments for column formwork and concrete pouring <p>Application practice</p> <ul style="list-style-type: none"> ▪ Column formwork and concrete pouring <ul style="list-style-type: none"> ○ Prepare and assemble elements for column formworks ○ Concrete preparation and pouring in columns ○ Taking out the formwork and column curing 	<p>4:00</p>	<ul style="list-style-type: none"> ▪ Show column formwork graphs ▪ Indicate the column formwork elements ▪ Point out the importance of plumb lining and tolerances ▪ Explain the column pouring procedure 	<ul style="list-style-type: none"> - Water - Sand - Helmet - Buggy - Nails - Cord - Square set - safety eyeglass - Carpenter pen - Cement - Crushed stone - Plumb lining - Metallic measure tape - Shovel - hammer - Hand level
Total time (hr.): 20:00 h		16:00		

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Making Framework and pouring ring beam			Competence Unit
Professional Formation Management	Capacity: Making Framework and pouring ring beam, according to task sheet, applying technological knowledge and respective procedures			N°13
Operation	Content	Length	Methodology	Didactic material
<ul style="list-style-type: none"> • Determine level • Measure and mark • Wire cutting • Steel cutting • Steel bending • Prepare framework • Prepare concrete • Pour and homogenize the concrete • Overlap steel bars • Take out the form work and curing 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Ring beam: Function, specification and location ▪ Construction process: steel and formwork for ring beam ▪ Minimum requirements (2.0, 2.2(d) – 3.0) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Basic operations with round and decimal numbers. Area and volume calculation. ▪ Proportions ▪ Geometric figures. Parallel and perpendicular lines <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Structure drawings, ring beam identification <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Description, types, uses. and conservation of tools, instruments and equipment for ring beam building <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Security rules in the ring beam framework and pouring <p>Application practice</p> <ul style="list-style-type: none"> ▪ Prepare framework, formwork and pour concrete in a ring beam <ul style="list-style-type: none"> ○ Prepare ring beam framework ○ Prepare and pour concrete ○ Take out the formwork and ring beam curing 	<p>6:00</p>	<ul style="list-style-type: none"> ▪ Explain ring beam function and location criteria ▪ Explain and demonstrate procedure to prepare steel and to make the framework ▪ Explain concrete pouring procedure in ring beam 	<ul style="list-style-type: none"> - helmet - Nails - Safety eyeglass - Shovel - Carpenter pen - Plumb lining - Lumber - wood spacer
Total time (hr.): 18 h				

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Light concrete slab formwork making	Competence Unit
Professional Formation Management Operation <ul style="list-style-type: none"> • Determine level • Measure and mark • Hand sawing • Nailing • Lumber overlapping • Plumb lining • Take out the formwork 	Capacity: Light concrete slab formwork making, according to task sheet, applying technological knowledge and respective procedures Content Technological knowledge <ul style="list-style-type: none"> ▪ Purpose of ring beam ▪ Purpose of small beam bottom fixing ▪ Purpose of light concrete slab vertical support fixing ▪ Fix ring beam external lateral border ▪ Considerations to determine element dimensions and distribution of the light concrete slab formwork ▪ Light concrete slab formwork: Definition, types, and elements that form it ▪ Minimum requirements (1.0(c), 1.4(a)) Drawing reading <ul style="list-style-type: none"> ▪ Structure drawings, light concrete slab identification TIEC Technology <ul style="list-style-type: none"> ▪ Description, types, uses. and conservation of chisel Hygiene and security on construction site <ul style="list-style-type: none"> ▪ Security rules in the light concrete slab formwork and takeout of framework Application practice <ul style="list-style-type: none"> ▪ Fix ring beams ▪ Fix small beam bottom ▪ Fix concrete slab vertical support ▪ Fix slab external lateral border ▪ Prepare framework, formwork and pour concrete in a ring beam <ul style="list-style-type: none"> ○ Prepare ring beam framework ○ Prepare and pour concrete ○ Take out the formwork and ring beam curing 	N°14 Didactic material <ul style="list-style-type: none"> - Measuring tape - plumb lining - carpenter pen - saw - hammer - hand level - Carpenter hook - Square set - helmet - Table for steel work - Lumber - Nails - Safety eyeglass - Carpenter pen - Boots - Leather gloves
<ul style="list-style-type: none"> ✓ Ring beam fixing ✓ Fix small beam bottom ✓ Fix light concrete slab formwork vertical support ✓ Fix Ring beam external lateral border 	Length 4:00	Methodology <ul style="list-style-type: none"> ▪ Explain the elements that form the light concrete slab formwork ▪ Organize groups for light concrete slab formwork making
	Length 18:00	

INSTRUCTOR MANUAL

Total time (hr.): 22 h		Learning Unit: Light concrete slab framework making		Competence Unit	
SENCICO				N°15	
Professional Formation Management		Capacity: Light concrete slab framework making, according to task sheet, applying technological knowledge and respective procedures			
Operation		Content		Methodology	
<ul style="list-style-type: none"> • Measure and marking • Wire cutting • Steel cutting • Steel bending • Steel overlap • Mark steel distribution • Steel tying 	<ul style="list-style-type: none"> ✓ Installing steel in small beams ✓ Brick alignment ✓ Installing iron steel 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Purpose of installing steel on small beams ▪ Light concrete slab: definition, types and elements. ▪ Purpose of brick alignment ▪ Purpose of installing steel temperature ▪ Steel temperature: Definition and purpose ▪ Small beams: definition and purpose ▪ Positive and negative steel ▪ Minimum requirements (2.0, 2.1(d)) <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Interpretation of roof structure drawings <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Description, types, uses and conservation of roof bricks <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Security rules in the light concrete slab building <p>Application practice</p> <ul style="list-style-type: none"> ▪ Install iron in small beams ▪ Brick alignment ▪ Instal temperature steel 	<ul style="list-style-type: none"> ▪ Explain the elements that form a light concrete slab ▪ Organize groups for light concrete slab building 	<ul style="list-style-type: none"> - Measuring tape - Hack saw - Steel - Chalk or crayon - Tin snip - Trap - Wire 16 - Steel pipe - Table for steel work - Drawings - hammer - helmet - Safety eyeglass - Carpenter pen - Boots, helmets - Leather gloves - Roof bricks 	
				Length	
				4:00	
				14:00	
Total time (hr.): 18 h					

INSTRUCTOR MANUAL

SENCICO	Learning Unit: Light concrete slab building	Competence Unit
Professional Formation Management	Capacity: Light concrete slab building, according to task sheet, applying technological knowledge and respective procedures	N°16
Operation	Content	Didactic material
<ul style="list-style-type: none"> • Prepare concrete • Pour concrete • Take out the formwork and cure • Homogenize concrete 	<p>Technological knowledge</p> <ul style="list-style-type: none"> ▪ Light concrete slab: definition, elements ▪ Roof structure ▪ Purpose of concrete homogenization ▪ Minimum requirements (1.0, 1.1(a, b, c, d)) <p>Applied mathematics</p> <ul style="list-style-type: none"> ▪ Proportions <p>Drawing reading</p> <ul style="list-style-type: none"> ▪ Roof structure drawing <p>TIEC Technology</p> <ul style="list-style-type: none"> ▪ Description, types, uses and conservation of tools for building light concrete slab <p>Hygiene and security on construction site</p> <ul style="list-style-type: none"> ▪ Security rules in the light concrete slab building <p>Application practice</p> <ul style="list-style-type: none"> ▪ Build light concrete slab: ▪ Concrete homogenization ▪ 	<ul style="list-style-type: none"> - Cement - Crushed stone - Water - Lumber - Scaffolding hammer - Hand level - Measuring tape - Lumber - Wood spacer
	Length	Methodology
	2:00	<ul style="list-style-type: none"> ▪ Organize groups for light concrete slab building
	10:00	
Total time (hr.): 12 h		

4.0 Minimum Requirements

(Annex 1)

Minimum Requirements for Safer Housing

JICA Study Team

1. Quality of Materials
2. Structural Section of Main Members
3. Connection of Structural Members

1. Quality of Materials

1.1 Concrete

- a) Mixture design for reinforced tie beam is one (1) portion of Portland cement, two (2) portions of clean coarse sand, four (4) portions of crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water. Mixture design for non reinforced tie beam is one (1) portion of Portland cement, eight (8) portions of hormigon, two and half (2.5) portions of medium stones (the size is maximum 4") and one and quarter (1.25) portions of clean and drinkable water.

Mixture design for confined columns, ring beams and light slab is one (1) portion of Portland cement, two (2) portions of clean coarse sand, three (3) portions of clean crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water.

In case of salty soil for foundation, vinyl sheet is used to prevent salt damage of concrete.

- b) Materials are well mixed where the aggregate is not visible and poured to form work immediately.
- c) Form work is hard and no bleeding.
- d) Any gaps and void is avoided by using a stick to compact concrete when it is pouring.

1.2 Mortar

- a) Mixture design is one (1) portion of Portland cement and four (4) portions of clean coarse sand.

1.3 Foundation

- a) Mixture design for foundation is one (1) portion of Portland cement, ten (10) portions of hormigon, three (3) portions of large stones (the size is maximum 10") and one and half (1.5) portions of clean and drinkable water.

Hormigon is composed of gravel and coarse sand directly obtained from quarry place

1.4 Wood

- a) Wood is hard, dry, dense fiber, well cured, no crack and straight.

1.5 Brick

- a) Brick is baked and orange color without white pale shadow. Brick is also dust free, without cracks or bending.

1.6 Water

- a) Water is clean and drinkable.

2. Structural Section of Main Members

Wall of confined masonry house is enclosed firmly with reinforced concrete tie beam, reinforced concrete column and reinforced concrete ring beam on a stable foundation with enough strength. Every vertical part of wall corner is firmly connected, forming confined elements.

2.1 Foundation

Foundation width and height is 60 cm or more. Foundation depth is no less than 80 cm.

2.2 Sections of reinforced concrete member

- a) Tie beam width is 13 cm or 24 cm according to the width of the wall. The minimum height is 50 cm. Tie beam is reinforced with four (4) steel bars of 3/8" diameter, with stirrups of 1/4" diameter at 20 cm intervals. If the soil is mainly composed of slime and/or sand, the tie beam is needed to be reinforced.
- b) Maximum wall area framed with tie beam, column and ring beam is 12.0 m². The maximum height of the wall is 2.4 m.
- c) Column has a minimum section of 13 cm wide and 15 cm high, and four (4) steel bars of 3/8" diameter are placed with hoops of 1/4" diameter. Five (5) hoops are placed from the connection point with tie beam. First hoop is placed at 5 cm from the connection point. The other four (4) hoops above the first hoop are placed at 10 cm interval. Another five (5) hoops are placed from the point with ring beam as the same case from the connection of tie beam. At the rest space of column hoops are placed at 25 cm interval.
Additionally, two (2) stirrups are placed in joint of column and ring beam at 10 cm interval. Two (2) stirrups are also placed in joint of column and tie beam at 10 cm interval.
- d) Minimum dimension of ring beam is 13 cm wide and 20 cm high, and four (4) steel bars of 3/8" diameter are placed with stirrups of 1/4" diameter. Five (5) stirrups are placed from the connection point with column. First stirrup is placed at 5 cm from the connection point. The other four (4) stirrups beside the first stirrup are placed at 10 cm interval. Another five (5) stirrups are placed from the connection point with the other column as the same case from the connection of the other above mentioned column. At the rest space of ring beam space stirrups are placed at 25 cm interval.
- e) Minimum covering depth of concrete is 2 cm for walls with finish and 3 cm for walls without finish. In case of foundation, covering depth is 7.5 cm.
- f) Minimum length of structural wall is 1.2 m.

2.3 Maximum span

Maximum span of columns is 5.0 m in case of 24 cm wide wall. It is 3.5 m in case of 13 cm wide wall.

3. Connection of Structural Members

3.1 Anchor of column to tie beam and ring beam

Four (4) steel bars of column anchor to the foundation. The steel bars bend 90° at 7.5 cm from the bottom of foundation. The bended steel bars are prolonged 25 cm. In order to connect steel bars of column and tie beam, additional four (4) steel bars connect with each column bar that anchors to the foundation. The additional bars bend 90° at 4 cm from the bottom of tie beam. The bended steel bars are prolonged 25 cm measured from the

column surface. In case of good soil, concrete without reinforcement is used and the four (4) steel bars of column anchor to the foundation.

In the same way, four (4) steel bars of column anchor to reinforced ring beam. The steel bars bend 90° at 2 cm from the top of ring beam. The bended steel bars are prolonged 25 cm measured from the column surface.

3.2 Connection of wall and column

There are two connection methods. One is that joint between wall and columns is geared and the length of the salient part of brick does not exceed 5 cm. The other is that two (2) steel bars of 1/4" diameter anchor at every four (4) layers of wall bricks at least 40 cm inside masonry and 12.5 cm inside column with vertical turning of 90° at 10 cm.

3.3 Overlapping of reinforcements

Steel bars of reinforced concrete overlap at least at 40 cm.

3.4 Wall joint mortar thickness

Thickness of joint mortar for wall is from 1.0 to 1.5 cm.

**5. Drawings
(Annex 2)**



Agencia de Cooperación Internacional del Japón



PERÚ

Ministerio
de Vivienda, Construcción
y Saneamiento

CONCIENTIZACION ACERCA DE VIVIENDAS SEGURAS
PARA EL ESTUDIO DE RECONSTRUCCION CON VIVIENDAS
SISMORRESISTENTES EN LA REPUBLICA DEL PERU

PLANOS DE LA VIVIENDA CON ESTRUCTURA EXPUESTA

JICA STUDY TEAM

27 DE AGOSTO DE 2008

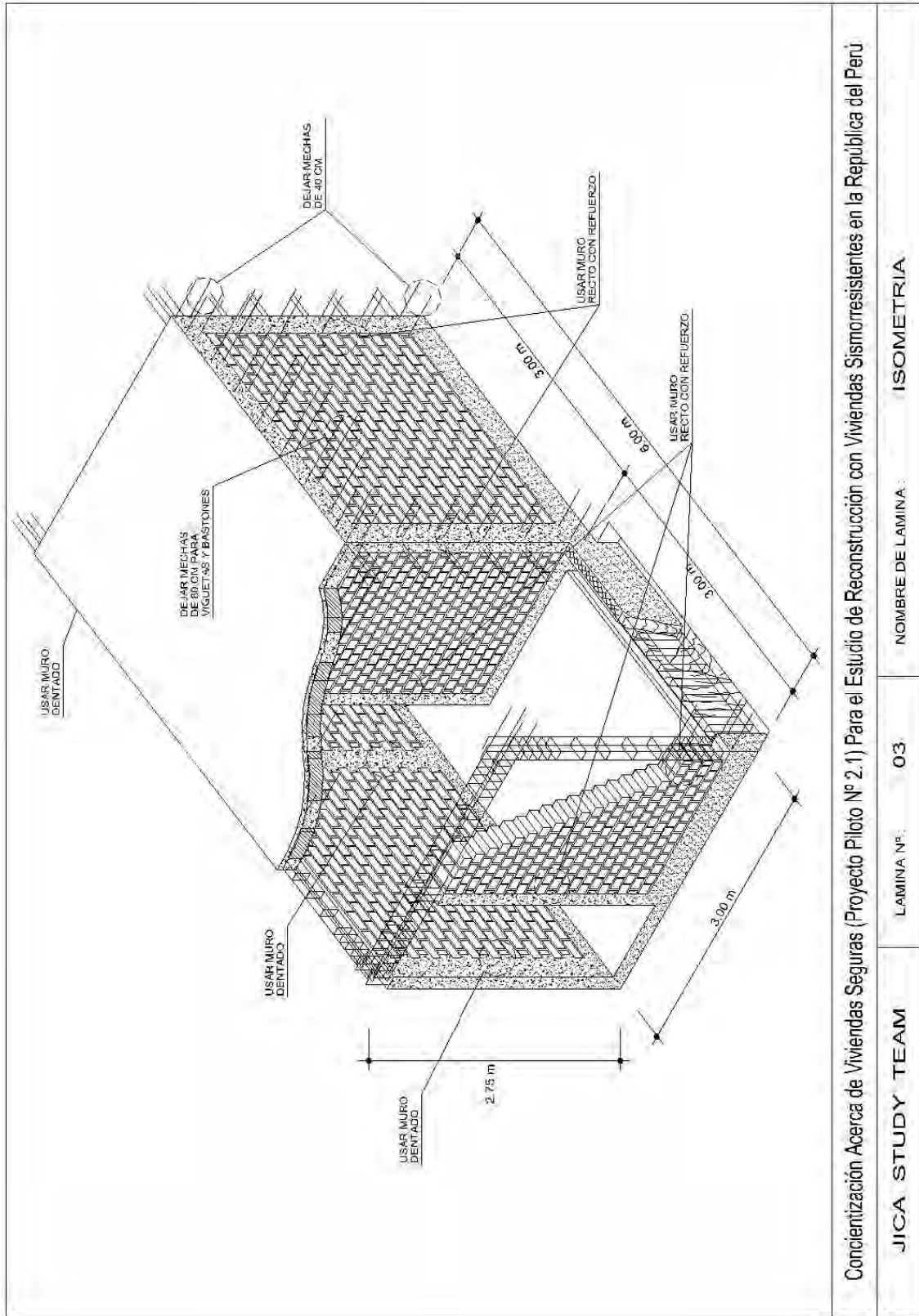
PROYECTO PILOTO N° 2.1
(ICA-PERU)

INDICE DE PLANOS :

LAMINA N°:

- ISOMETRIA	03
- PLANO DE PLANTA 1° PISO	04
- PLANO DE PLANTA TECHO	05
- PLANO DE ELEVACIONES	06
- PLANO DE CORTES	07
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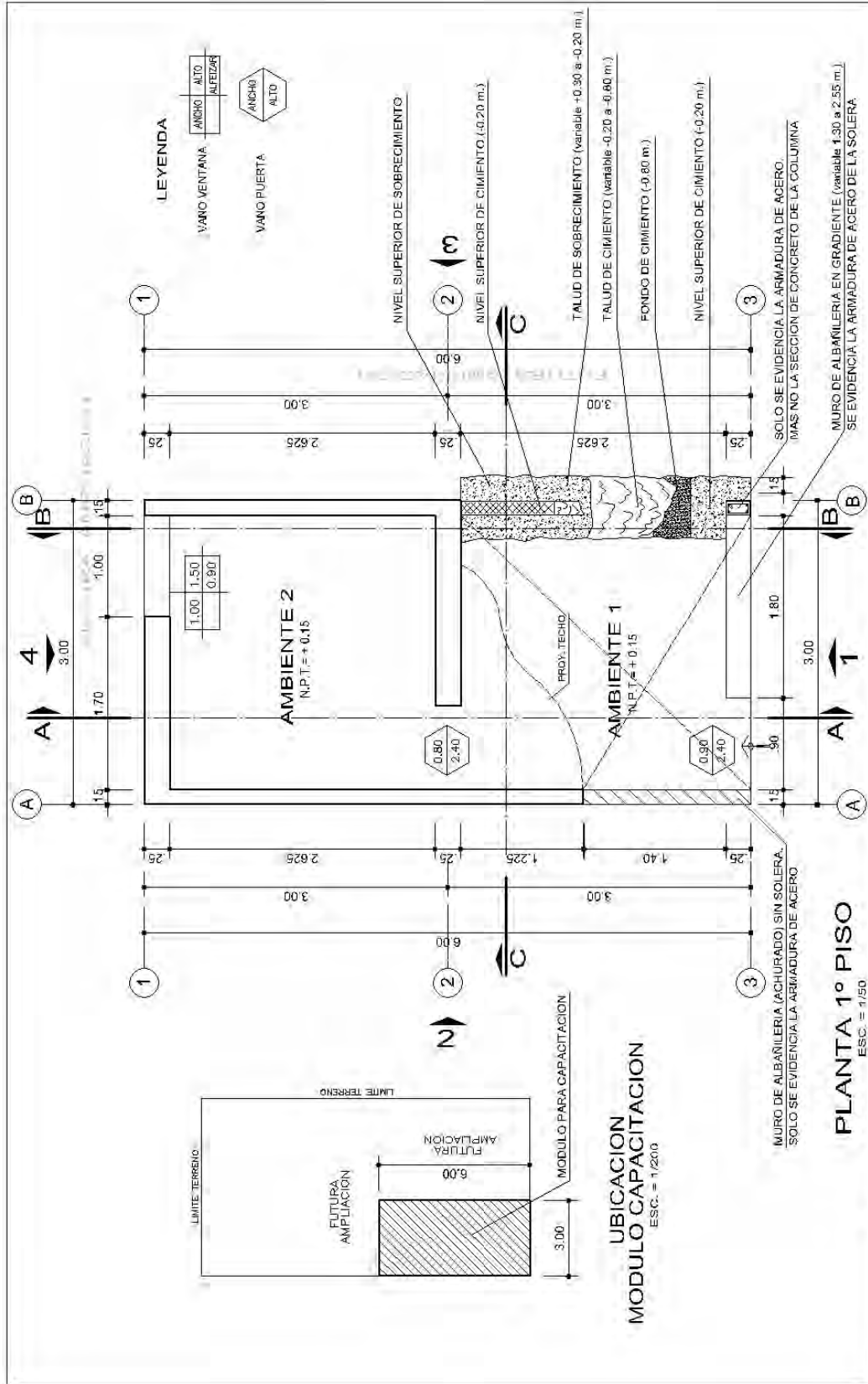
INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM LAMINA N°: 03 NOMBRE DE LAMINA: ISOMETRIA

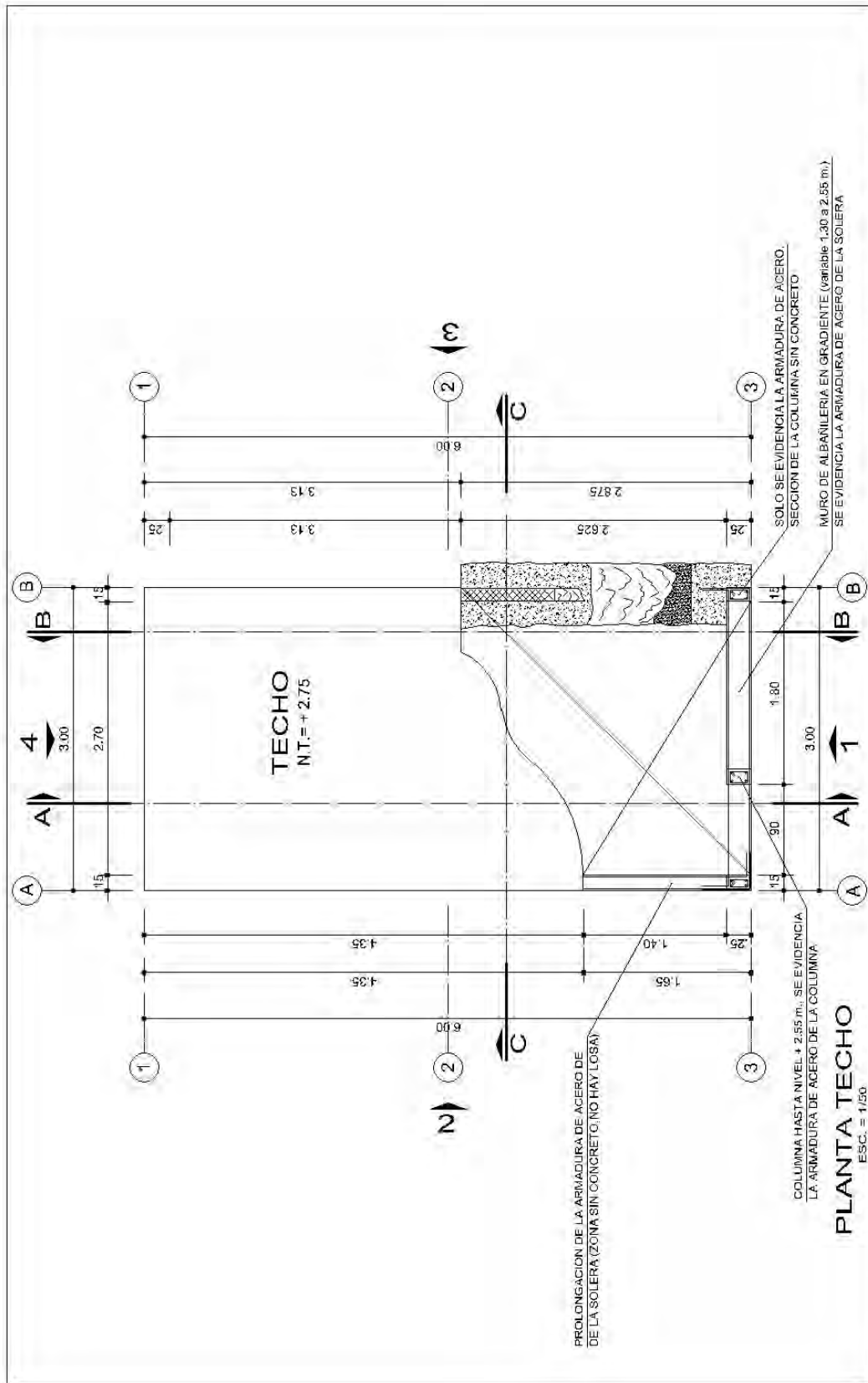
INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM	LAMINA N°: 04	NOMBRE DE LAMINA: PLANTA 1º PISO
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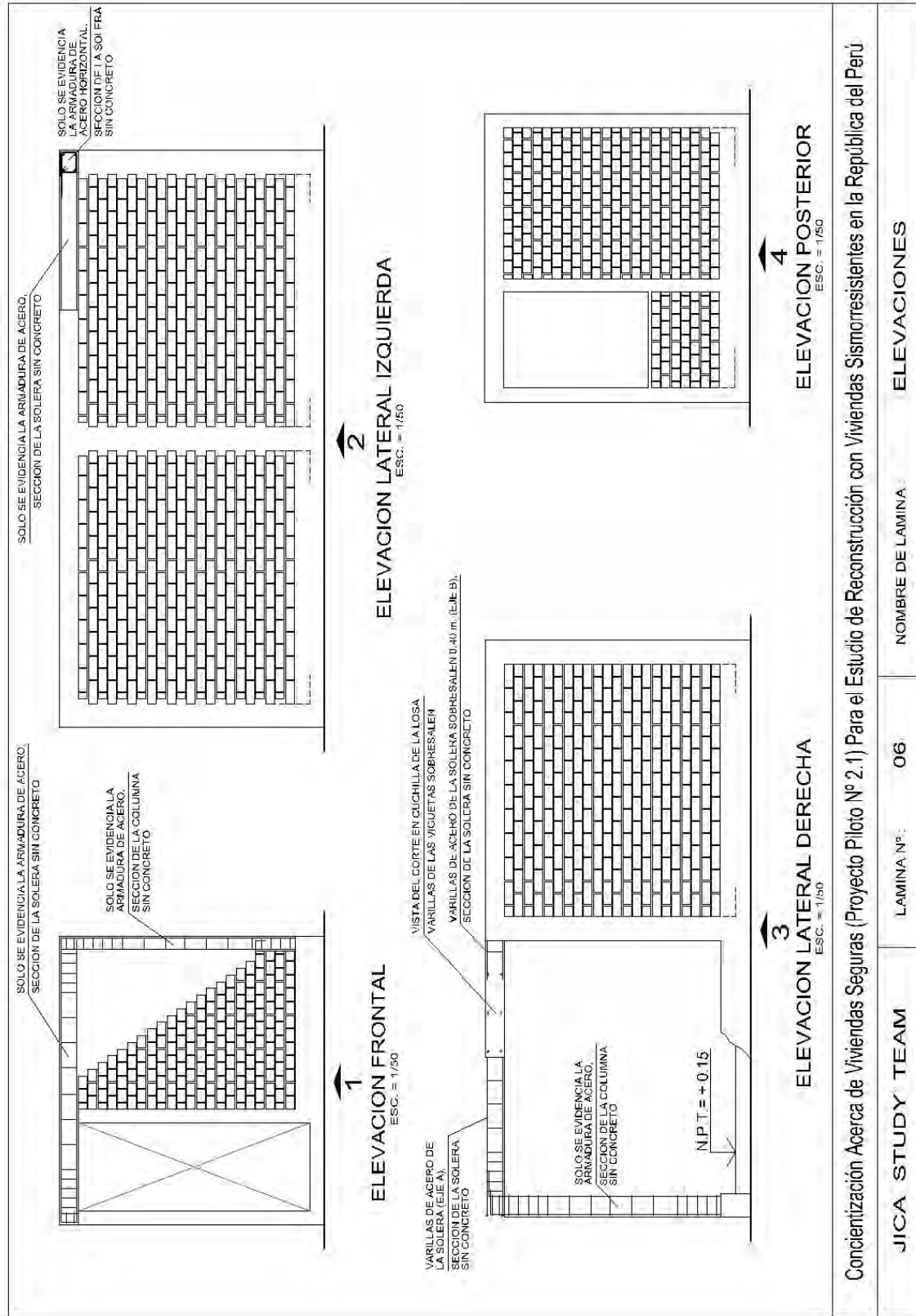
INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismoresistentes en la República del Perú

JICA STUDY TEAM	LAMINA N°: 05	NOMBRE DE LAMINA: PLANTA TECHO
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INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM

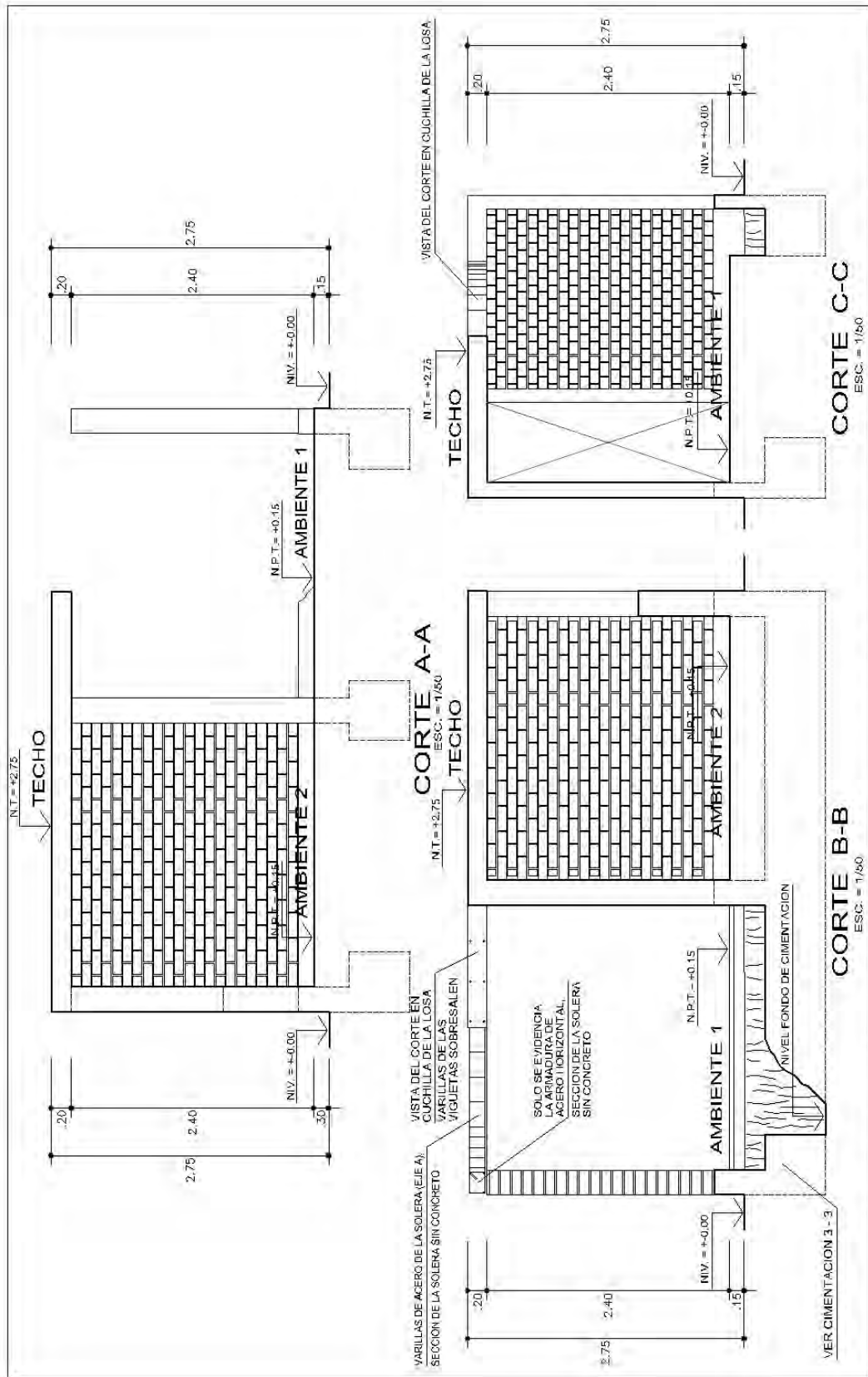
LAMINA N°:

06

NOMBRE DE LAMINA:

ELEVACIONES

INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismoresistentes en la República del Perú

JICA STUDY TEAM

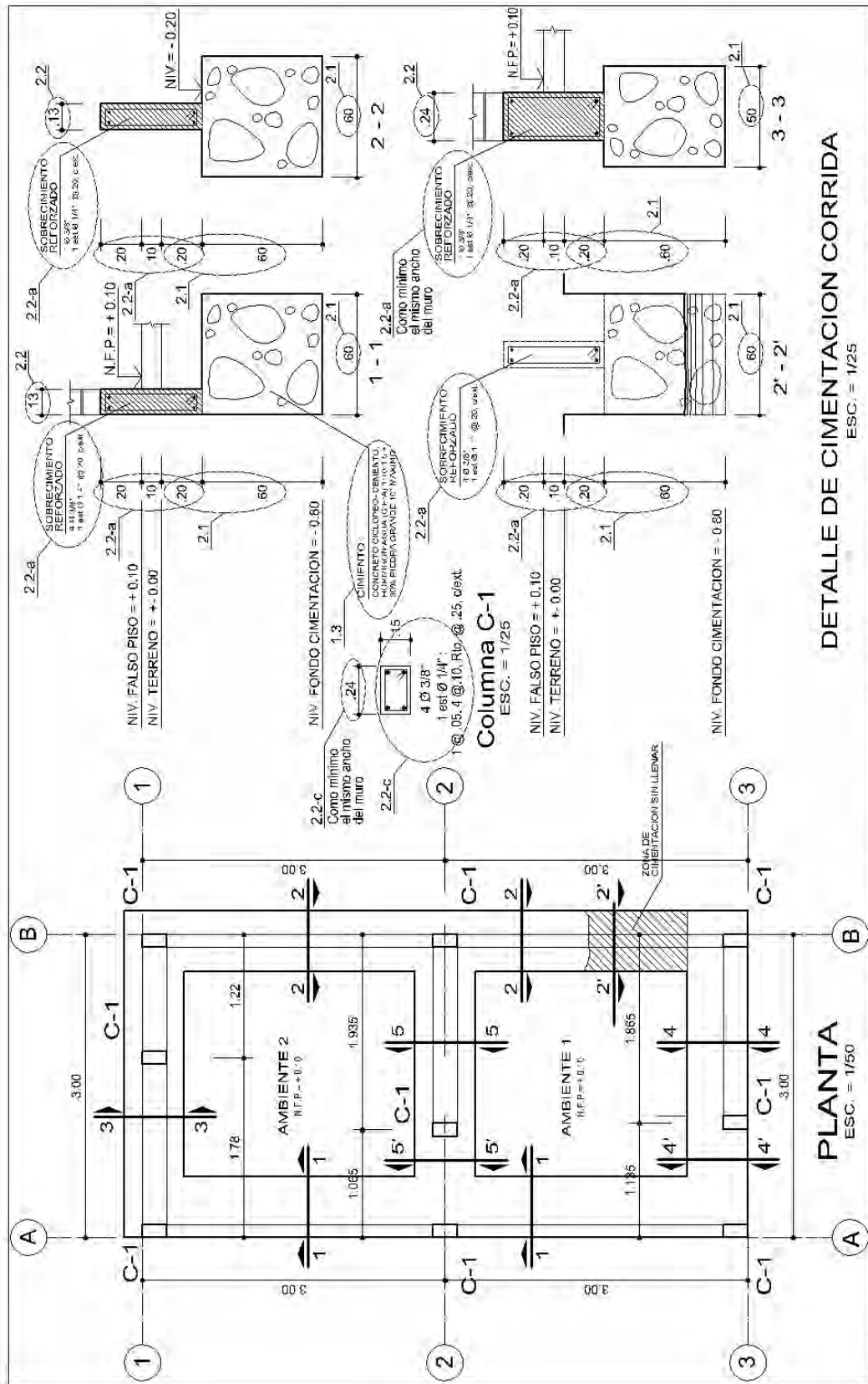
LAMINA N°:

07

NOMBRE DE LAMINA:

CORTES

INSTRUCTOR MANUAL



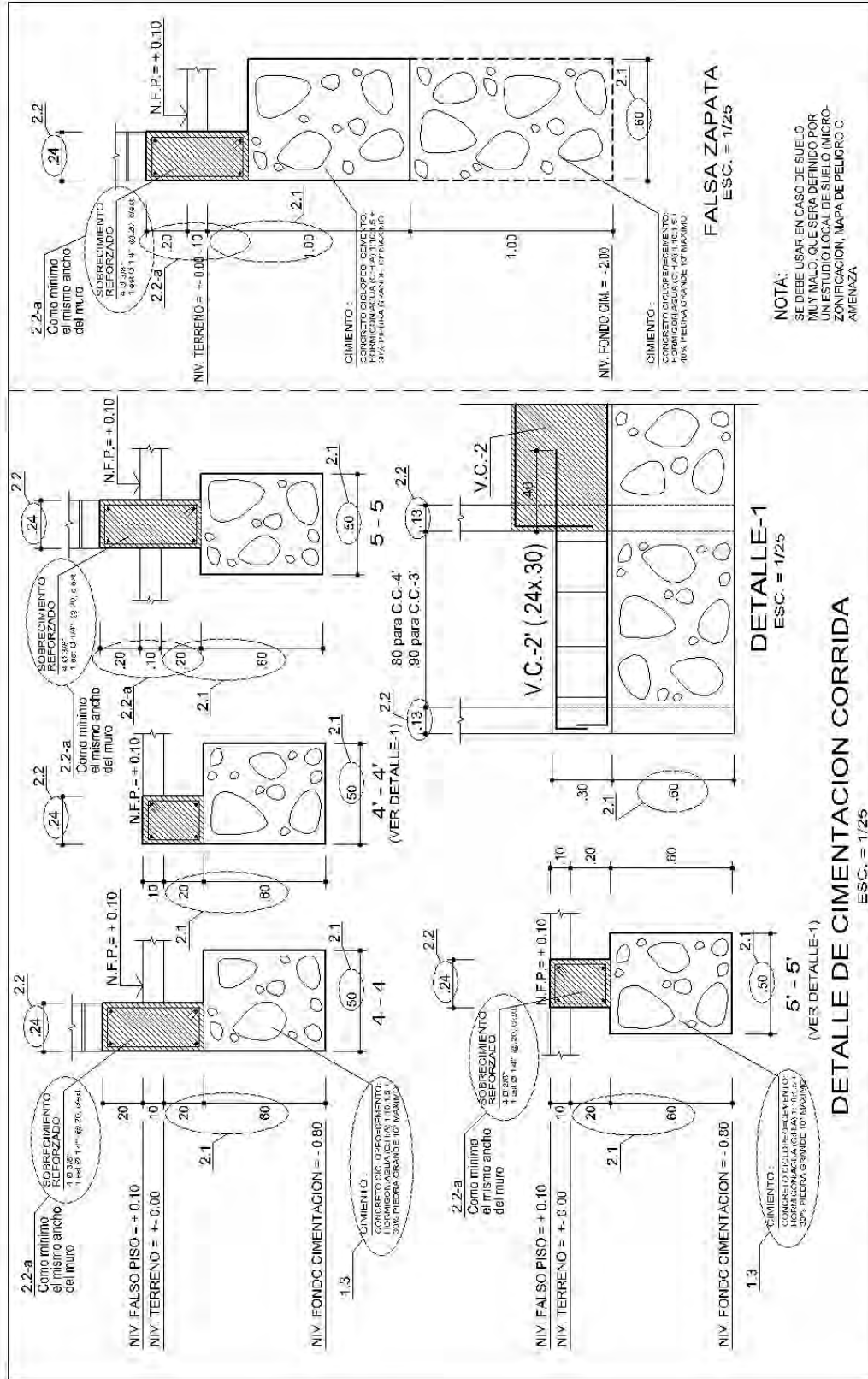
DETALLE DE CIMENTACION CORRIDA
 ESC. = 1/25

PLANTA
 ESC. = 1/50

Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismoresistentes en la República del Perú

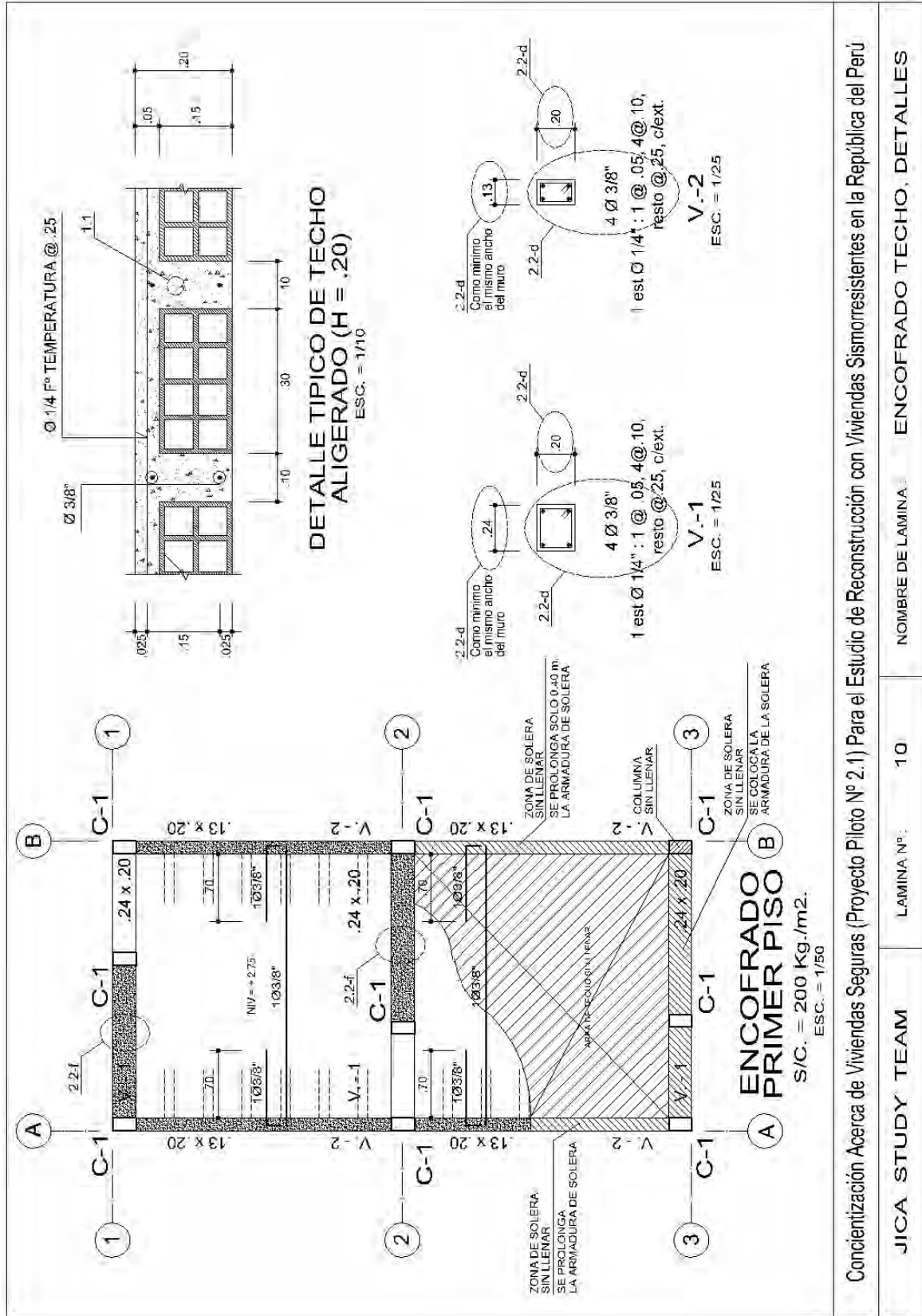
JICA STUDY TEAM	LAMINA N°: 08	NOMBRE DE LAMINA: CIMENTACION, DETALLES
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INSTRUCTOR MANUAL



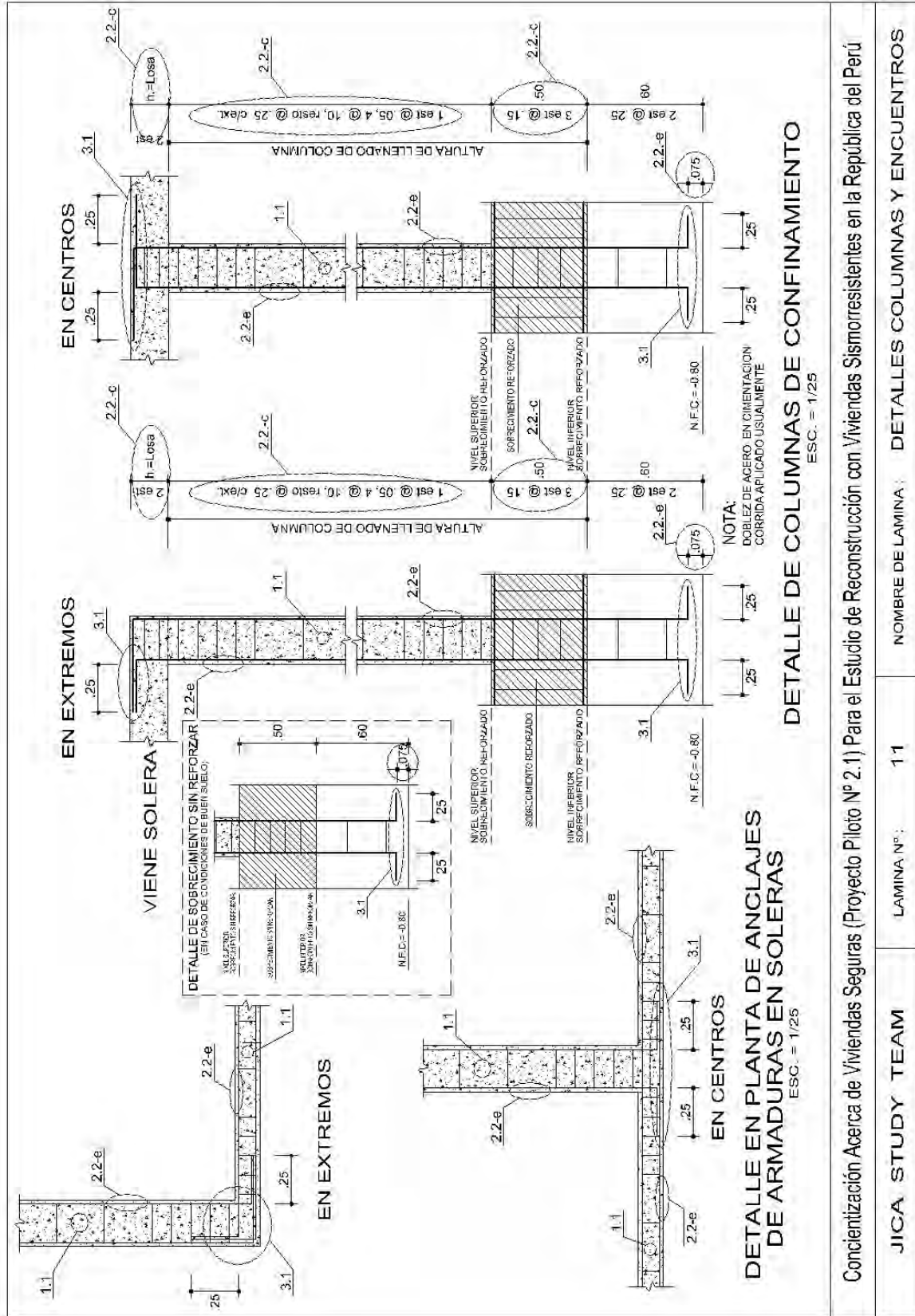
Concientización Acerca de Viviendas Seguras (Proyecto Piloto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú			
JICA STUDY TEAM	LAMINA Nº:	09	NOMBRE DE LAMINA: DETALLES DE CIMENTACION

INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

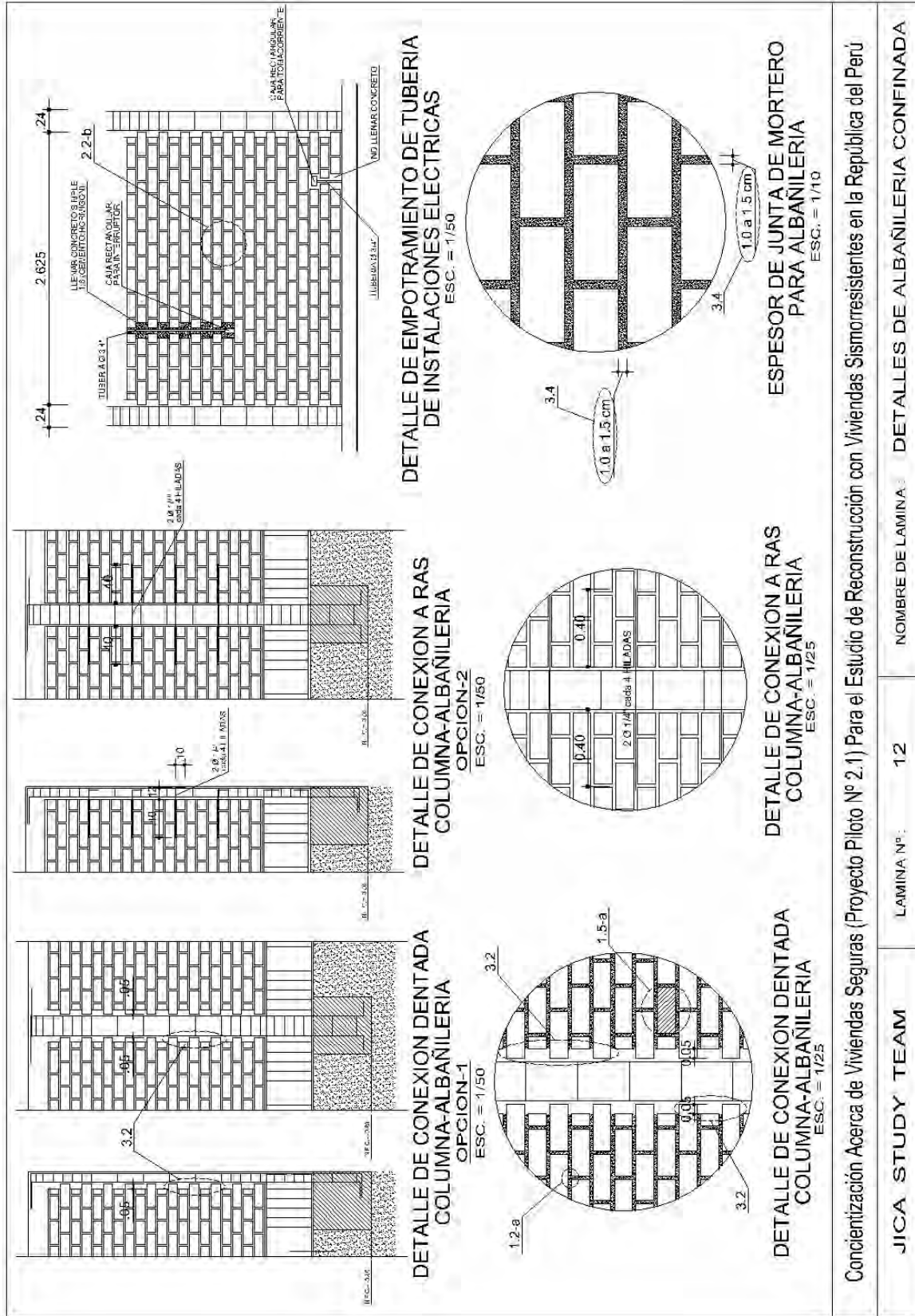
INSTRUCTOR MANUAL



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM	LAMINA N°: 11	NOMBRE DE LAMINA: DETALLES COLUMNAS Y ENCUENTROS
-----------------	---------------	--

INSTRUCTOR MANUAL



ESPECIFICACIONES TÉCNICAS DE LOS MATERIALES

ACEROS: HL-ULK-20
 LAS VARILLAS DE ACERO UTILIZADAS EN LA CONSTRUCCIÓN DE ESTRUCTURAS DE ALBANELERÍA DEBEN CUMPLIR LAS SIGUIENTES ESPECIFICACIONES EN LOS CAPÍTULOS 7 Y 8 DE LA NORMA E-060 PARA CONCRETO ARMADO DE ALACRANES DE CALIDAD, BRASO EN, CON UN ESFUERZO EN EL LÍMITE DE FLUENCIA DE 57-4200 kg/cm².
 COPRIFICACIONES DE ACERADO A LA NORMA ASTM A-615
 DIÁMETROS MÍNIMOS DE DOBLADO SIN FISURAS:
 Ø 3/8" o 95/8"
 Ø 3/4" y MAYORES 40b
 DEBERÁ OBSERVARSE QUE LAS VARILLAS A EMPLEAR PRESENTEN SU SUPERFICIE LIBRE DE CORRUCIÓN, GRIETAS, SOLDADURAS U OTRO DEFECTO.

COLOCACIÓN DEL REFUERZO:
PREPARACIÓN Y COLOCACIÓN:
 ANTES DEL EMPLEO DE LAS VARILLAS SE LIMPIARÁN CUIDADOSAMENTE PARA QUE SE ENCUENTREN LIBRES DE POLVO, BARRO, ACEITES, FANGOS Y TODA OTRA SUSTANCIA CAPAZ DE REDUCIR LA ADHERENCIA CON EL CONCRETO. PARA SOSTENER O FIJAR LAS VARILLAS EN LOS LUGARES CORRESPONDIENTES SE EMPLEARÁN SOPORTES O ESPACADORES METÁLICOS O DE MORTERO Y ACABARÁN METÁLICOS, NO PODRÁN UTILIZARSE TROCOS DE LAPILLA, MADERA, O CAÑAS, NI PARTICULAS DE ABRICADORAS.

REQUERIMIENTOS DEL REFUERZO:
 SE ENTENDE POR REQUERIMIENTOS A LA DISTANCIA LIBRE COMPROMETIDA ENTRE EL PUNTO MÁS SALIENTE DE CUALQUIER REFUERZO Y LA SUPERFICIE EXTERNA DEL CONCRETO MÁS PRÓXIMO, EXCLUYENDO EMPALMES U OTRO MATERIAL DE ALBANELERÍA.

REQUERIMIENTOS DEL REFUERZO:
REQUERIMIENTOS DE LOS REQUERIMIENTOS:
 REQUERIMIENTOS:
 - SOLERAS Y COLUMNAS DE ALBANELERÍA (VARRILLAS) 2.0 cm.
 - SOLERAS Y COLUMNAS DE ALBANELERÍA (CARRASCA) 3.0 cm.
 - CEMENTOS CORRIDOS 7.5 cm.
 CUANDO SEA NECESARIO LOS REQUERIMIENTOS SE FORMARÁN MEDIANTE EL EMPLEO DE DADOS DE CONCRETO O MORTERO.

RECORRIMIENTO EN SOLERAS Y COLUMNAS:

 LA SEPARACIÓN MÍNIMA ENTRE VARILLAS RECTAS INDIVIDUALES Y PARALELAS DE LA ARMADURA FUERA DE UNA ZONA DE EMPALME, EN GENERAL DEBERÁ SER COMO MÍNIMO 2.00 cm. Y NO MENOR QUE EL TAMAÑO MÁXIMO DE AGREGADO GRUESO.

CONCRETO

CONCRETO SIMPLE
 -Ortenido:
 1:10:1.5 (CEMENTO : HORMIGÓN : AGUA) + 300 PM 10" MAX.
 CONCRETO ARMADO
 -Substitución mínima:
 12x41 (CEMENTO : ARENA GRUESA : PIEDRA CHANCADA 1/2" - 40x4)
 1:2:3:1 (CEMENTO : ARENA GRUESA : PIEDRA CHANCADA 1/2" - 40x4)
 -Suma de conglomerados:
 1.25x1 (CEMENTO : ARENA GRUESA : PIEDRA CHANCADA 1/2" - 40x4)
 1.25x1 (CEMENTO : ARENA GRUESA : PIEDRA CHANCADA 1/2" - 40x4)
 ALICATORIOS
 - Los alicates deberán estar libres de polvo, sin grietas ni abatas.

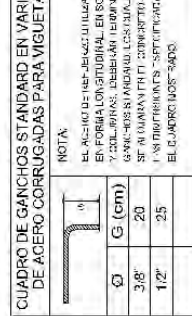
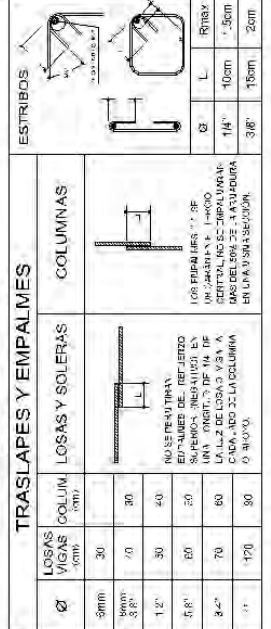
ACERO
 -Estructo fibrosa fy = 4,200 kg/cm²
 LONGITUD DE ANCLAJE 3Ø DIÁMETROS

MORTERO
 Mortero cohesionado, trabado, retentivo y fluido.
 (C=1:4) cemento (p.e. I, II y IP)

CRITERIOS DE DISEÑO ESTRUCTURAL

A. CULGOS DE SI EN LAZOS UTILIZADOS
 -NORMA CODIFICADA LITI 747-03
 NORMA E-000 (corros) (acero inoxidable)
 NORMA E-000 (acero inoxidable)
 NORMA E-000 (concreto armado)
 NORMA E-000 (alicates)
 2.00: REGLAMENTO
 Reglamento Nacional de Edificaciones
 3. CARGAS DE DISEÑO
 2.00 sobrecarga viva (hecho) m3/m² 300 kg/cm²
 3.00 masa propia de aligerado 300 kg/cm²

C. CUALIFICACIONES
 CUALIFICACION TIPO CEMENTO CORRIDO
 a. Ø máxima 0.80 mm.
 b. profundidad de penetración aceptada 0.80 m. min.



PARAMETROS SISMICOS	
PARAMETRO	FACTOR
Factor de Zona	Z = 0.4
Categoría	U = 1.3
Tipo de Suelo	S = 1.0
Importancia de Estructura	Tp = 0.8
Coeff. de Reducción	R = 8
Coeff. Sismico	C = 2.5

CUADRO DE GANCHOS STANDARD EN VARILLAS DE ACERO CORRUGADAS PARA VIGUETAS	
NOTA	
EL ACERO DE REFUERZO UTILIZADO EN FORMA LONGITUDINAL EN SOLERAS Y COLUMNAS DEBERÁ EMPLEARSE GANCHOS SI AMBOS LOS CASOS SE APLICAN EN EL DISEÑO DE CUALQUIERA DE ELLOS.	
Ø (cm)	G (cm)
3/8"	20
1/2"	25

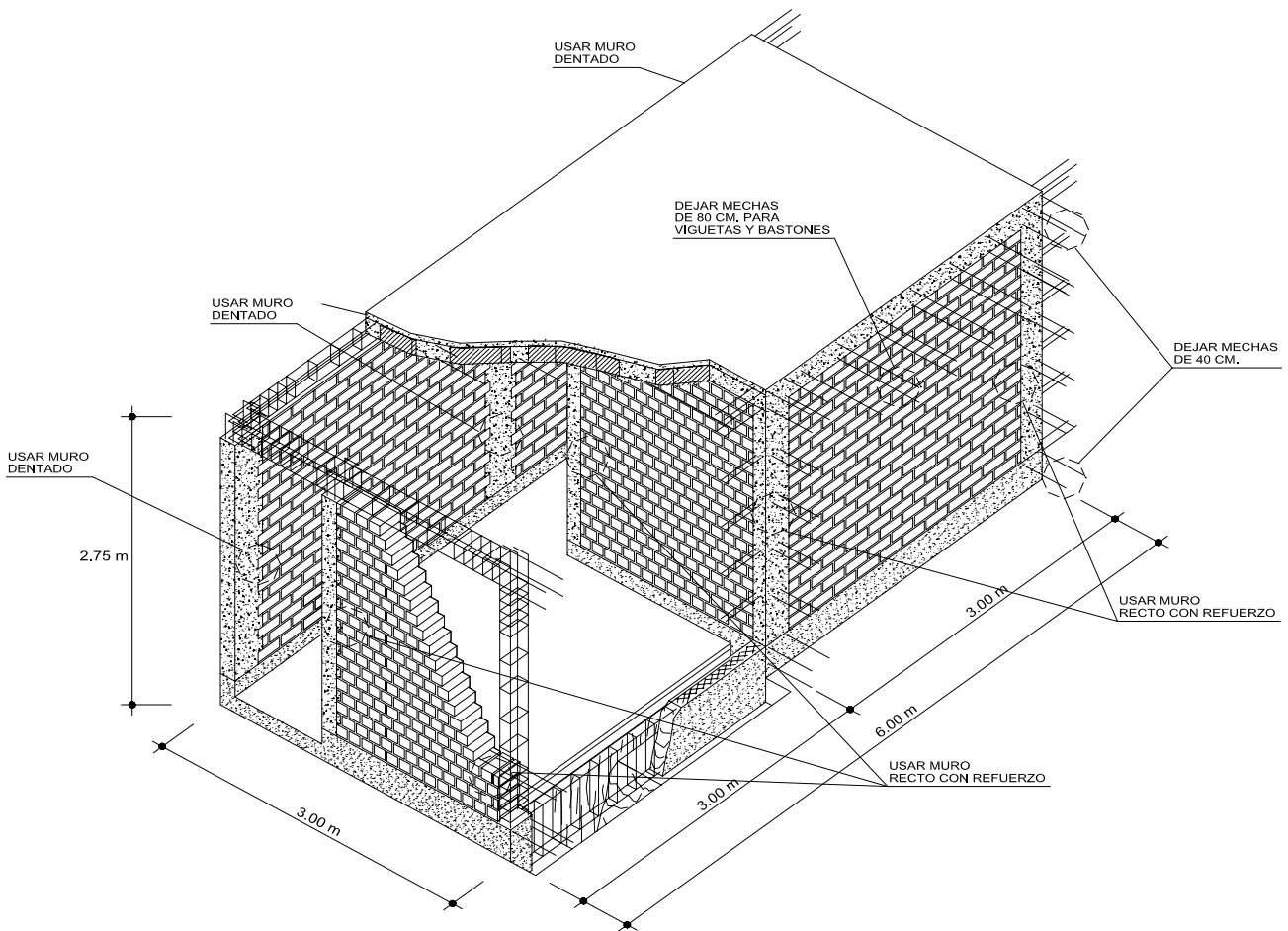
Appendix 3

Participant Textbook

TRAINING COURSE

AWARENESS - RAISING CONCERNING SAFER HOUSING AGAINST EARTHQUAKE

PARTICIPANT TEXTBOOK



Pueblo Nuevo, Chincha - 2008

This Participant Textbook has been prepared by **JICA** and **SENCICO** with the technical and financial cooperation of the Government of Japan.

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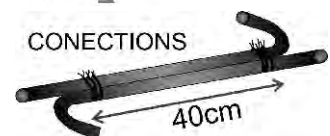
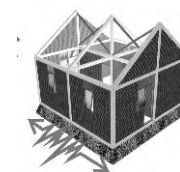
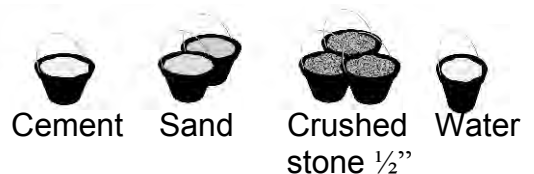
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Promotor Educativo
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Camacho

OBJECTIVE

The objective of this participant textbook is to teach ordinary people the most important necessary knowledge (minimum requirements) to build a seismic resistant safer house.

Minimum Requirements

- Quality of materials
- Structural section of main members
- Connection of structural elements



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1. CHRONOGRAM

PARTICIPANT TEXTBOOK

ACTIVITIES JICA - SENCICO CHRONOGRAM

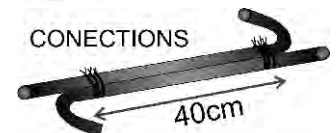
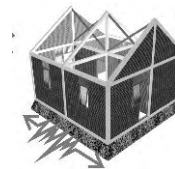
N°	DENOMINATION	SEPTEMBER							OCTOBER							NOVEMBER							TOTAL HRS AAAS						
		L	M	J	V	Sb	L	M	L	M	J	V	Sb	L	M	L	M	J	V	Sb	L	M							
1	READING OF DRAWINGS																											20	
2	TRACING OF FOUNDATION																												18
3	EXCAVATION OF DITCHES																												10
4	MAKING OF CONFINED COLUMN FRAMEWORK																												22
5	BUILDING OF FOUNDATION																												10
6	REINFORCED TIE BEAM FRAMEWORK																												20
7	WOOD PREPARATION AND TIE BEAM FORMWORK																												20
8	TIE BEAM BUILDING																												10
9	FIRST BRICK ROE INSTALLATION																												9
10	WALL BUILDING																												27
11	CONFINED COLUMN FORMWORK AND MIX POURING																												20
12	WOOD PREPARATION AND RING BEAM FORMWORK																												20
13	RING BEAM FRAME WORK MAKING																												18
14	SLAB FORM WORK																												22
15	LIGHT SLAB FRAME WORK MAKING																												18
16	LIGHT SLAB BUILDING																												12
COURSE TOTAL		276																											

OBJECTIVE

The objective of the participant textbook is to teach ordinary people the necessary knowledge (minimum requirements) to build a safer house

MINIMUM REQUIREMENTS

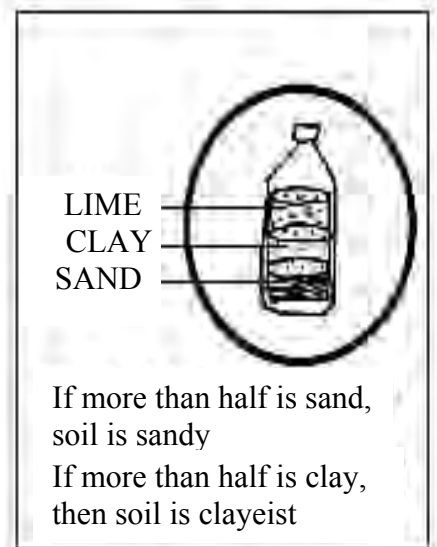
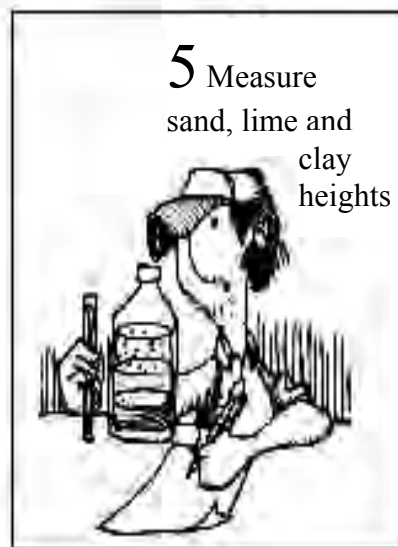
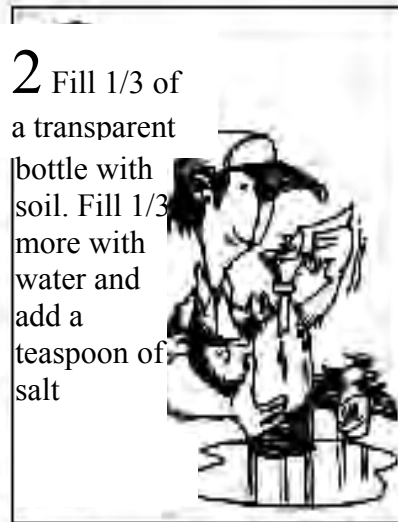
- Quality of materials
- Structural section of main members
- Connection of structural elements



2.CONSTRUCTIVE PROCESS

CHAPTER 1: KNOWING YOUR LAND AND READING THE DRAWINGS

Before you build your house, go to the municipality where you live and ask a report about the quality of your land soil. If there is no soil study, we recommend you to follow the next steps if your soil does not consist of grave or stone:



READING THE DRAWINGS OF YOUR HOME

Drawings are figures that represent forms and dimensions of edification in a convenient scale, with the fundamental objective of translating the projectist idea to the builders.

CHAPTER 2: CLEANING, LEVELLING AND TRACING OF LAND

2.1 CLEANING THE LAND

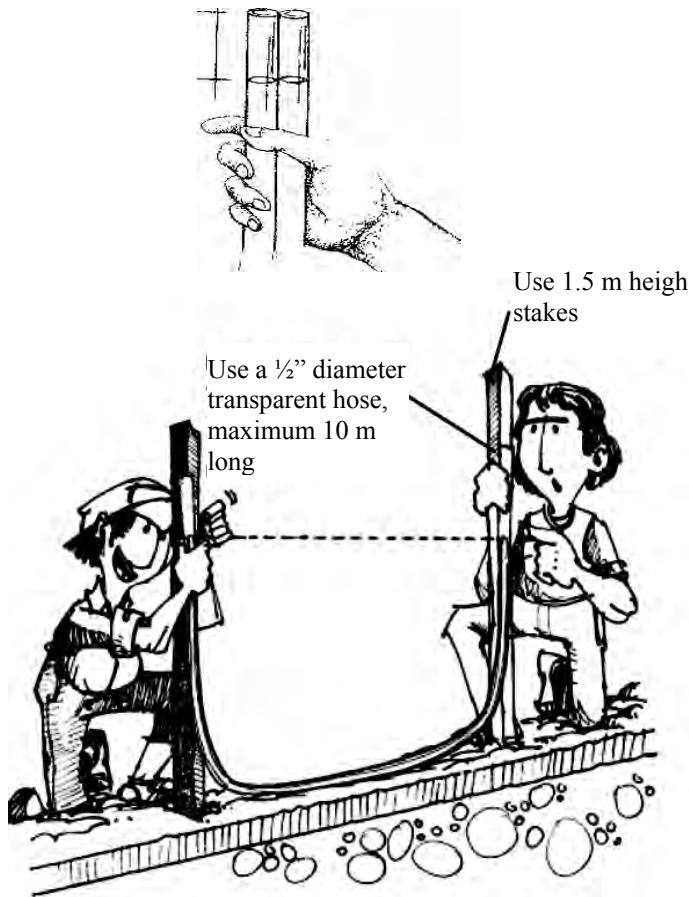
It involves the elimination of garbage or free elements, light and heavy present on the land surface destined for building, as well as the extraction of roots and small trees.

Organic soil is bad for construction



2.2 DETERMINING OF LEVEL

All the land should be at the same level and to get this follow the next steps:



1

Fill the hose with clean water and verify the absence of bubbles.

2

Check the exactness and functioning joining both hose ends and verifying that water is at the same height.

3

Place stakes in the borders of the land and verify that they are vertical using a plumb.

4

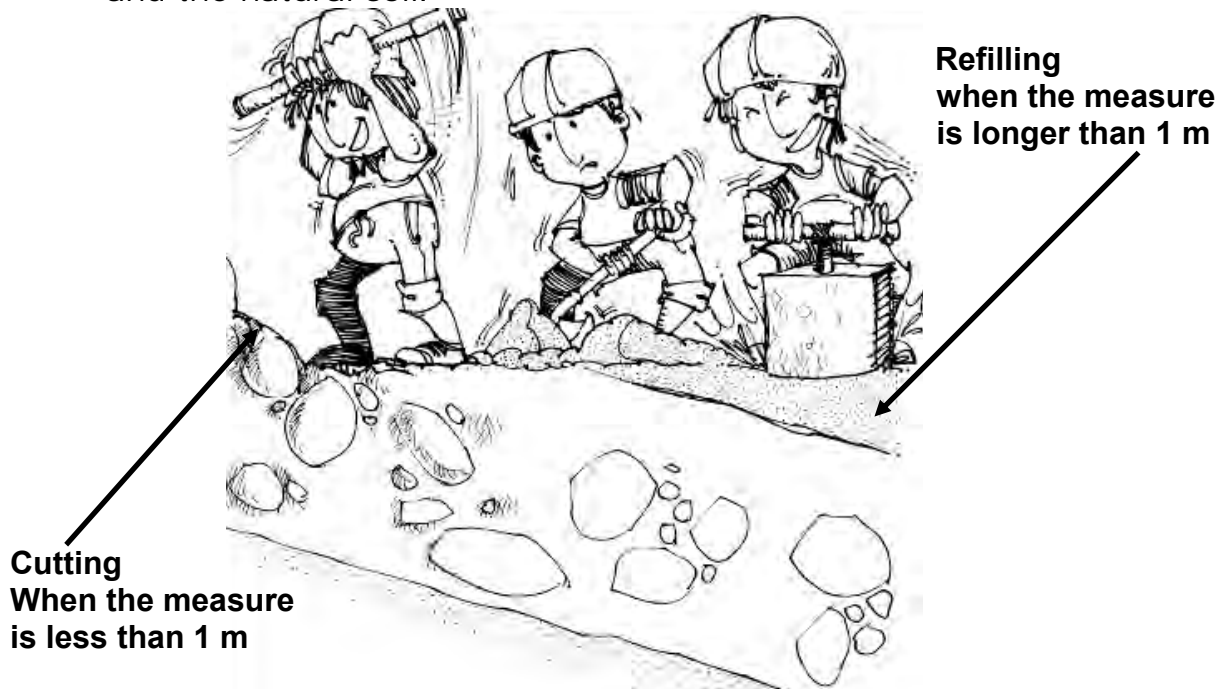
With the help of a stake identify a reference point i.e. the pavement and mark on the stake a height of 1 m above the reference level.

5

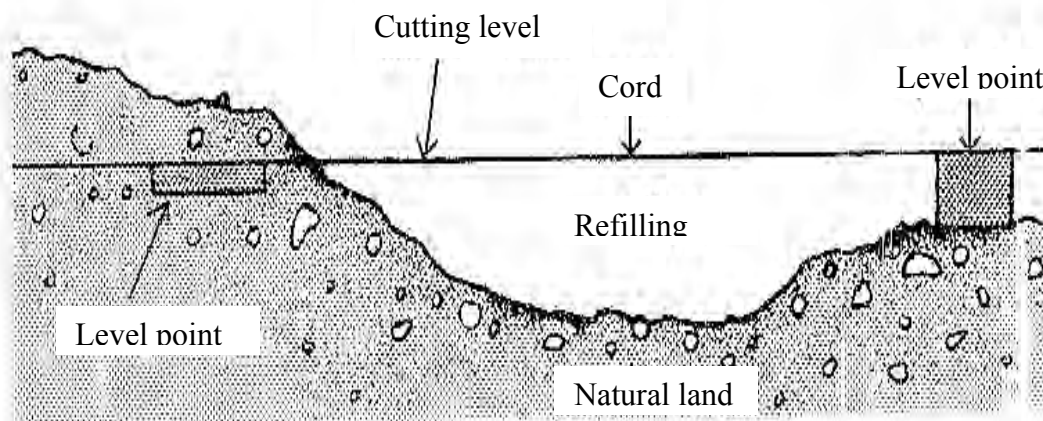
With the help of the hose, bring the mark of the first stake to the other stakes.

2.3 CUTTING AND REFILLING

a) After marking all the stakes, measure in every stake the height between the mark and the natural soil.



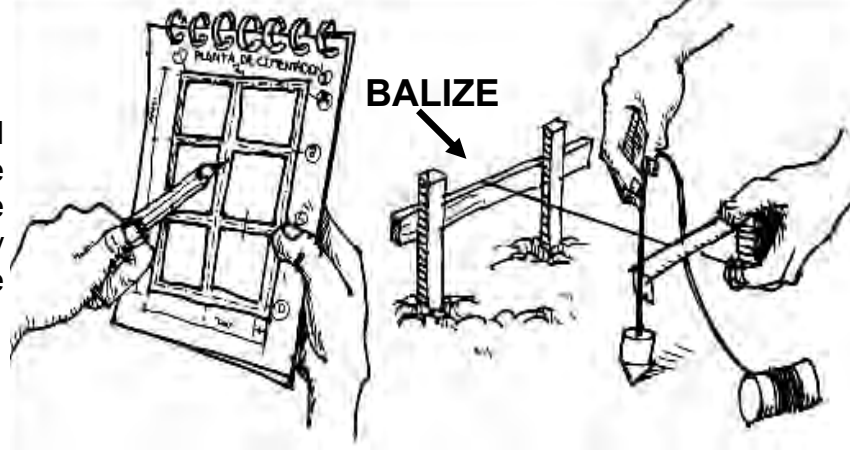
b) Refill and/or cut the land until the height between the mark and the soil is 1 m



2.4 TRACING

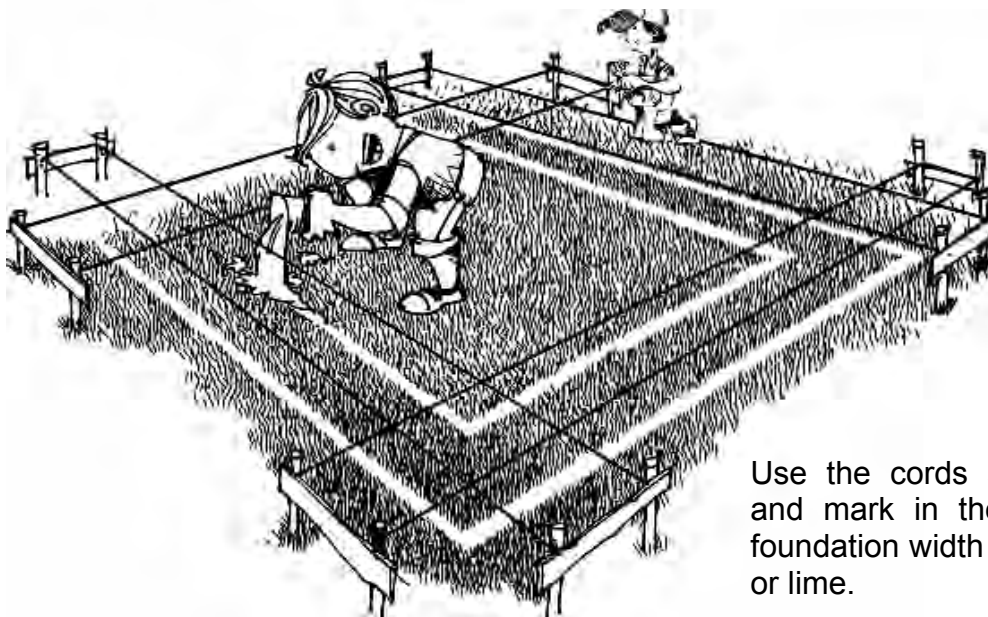
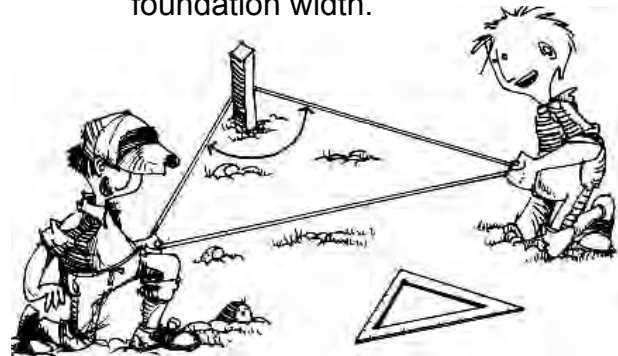
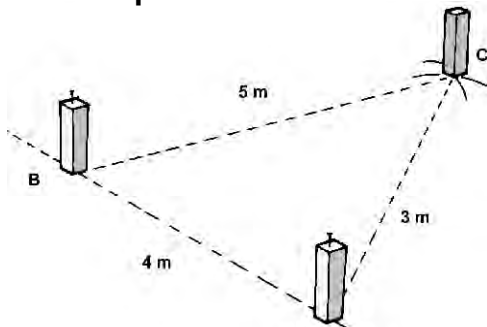
Tracing is useful to indicate in the land where the foundation of your house is going to be built. Prepare several balizes with wood sticks.

According to the measures indicated in the drawing, place the balizas on the land, so that they correspond to the foundation sides.



Determine the center of each foundation and install cords between balizas to define the foundation width.

Graphic method to find a 90° angle



Use the cords as guides and mark in the soil the foundation width with chalk or lime.

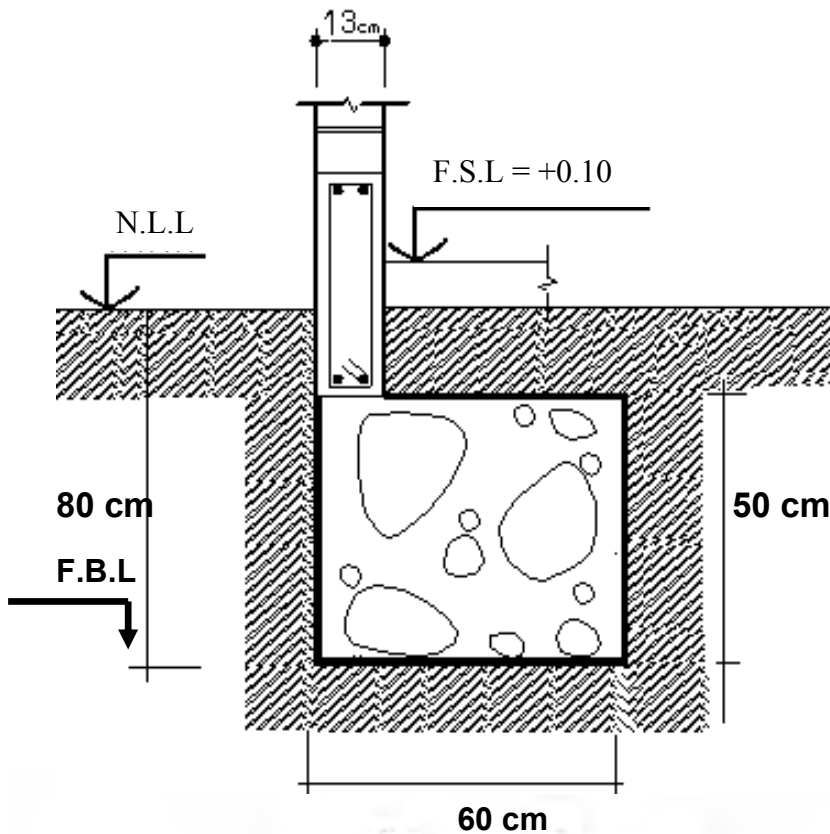
CHAPTER 3: EXCAVATING THE FOUNDATION

MINIMUM REQUIREMENTS

2.0 Structural Section of Main Members

2.1. Foundation

Foundation width and height are 60 cm or more. Foundation depth is no less than 80 cm.



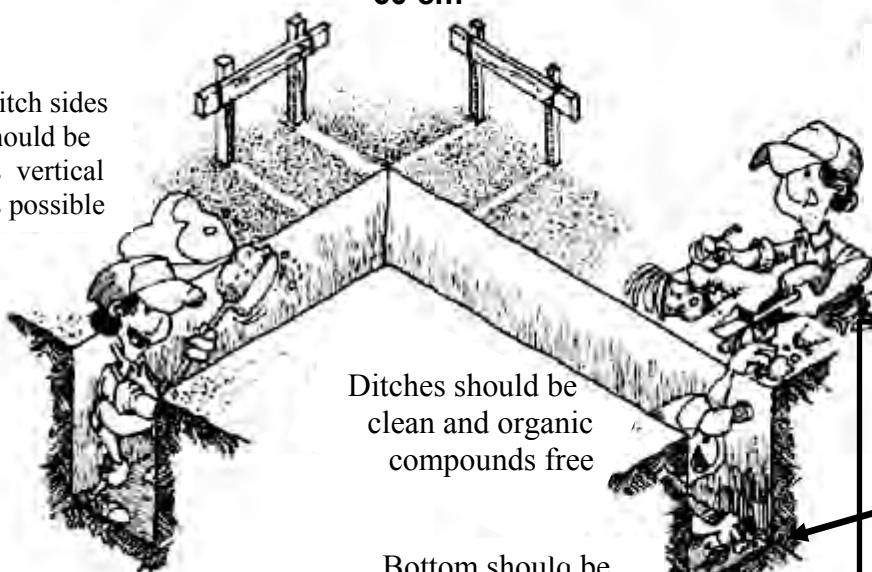
Legend

F.B.L : Foundation bottom level

N.L.L : Natural Land Level

F.S.L : Floor Slab Level

Ditch sides should be as vertical as possible



Ditches should be clean and organic compounds free

Bottom should be levelled, clean and without soil powder

Ditch excavation

Excavate foundation ditch using chalk marks as guides

If the soil at the ditch bottom is difficult to level, it is possible to input a poor concrete mix (1:12) for the bottom of the ditch in order to have it levelled

CHAPTER 4: MAKING CONFINED COLUMN

MINIMUM REQUIREMENTS

2.0 Structural Section of Main Members

2.2 Sections of RC concrete member

- c) Column has a minimum section of 13 cm wide and 15 cm high, and four (4) steel bars of 3/8" diameter are placed with hoops of 1/4" diameter. Five (5) hoops are placed from the connection point with tie beam. First hoop is placed at 5 cm from the connection point. The other four (4) hoops above the first hoop are placed at 10 cm interval. Another five (5) hoops are placed from the point with ring beam as the same case from the connection of tie beam. At the rest space of column hoops are placed at 25 cm interval. Additionally, two (2) stirrups are placed in joint of column and ring beam at 10 cm interval. Two (2) stirrups are also placed in joint of column and tie beam at 10 cm interval.

3.0 Connection of Structural Members

3.1 Anchor of column to reinforced tie beam and ring beam

Four (4) steel bars of column anchor to the foundation. The steel bars bend 90° at 75 mm from the bottom of foundation. The bended steel bars are prolonged 25 cm. In order to connect steel bars of column and tie beam, additional four (4) steel bars connect with each column bar that anchors to the foundation. The additional bars bend 90° at 40 mm from the bottom of tie beam. The bended steel bars are prolonged 25 cm measured from the column surface. In case of good soil, concrete without reinforcement is used and the four (4) steel bars of column anchor to the foundation. In the same way, four (4) steel bars of column anchor to reinforced ring beam. The steel bars bend 90° at 20 mm from the top of ring beam. The bended steel bars are prolonged 25 cm measured from the column surface.

3.3 Overlapping of reinforcements.

Steel bars of reinforced concrete overlap at least at 40 cm.

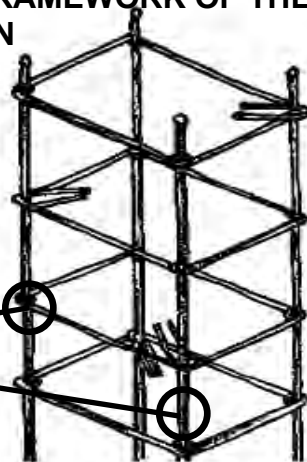


4.1 PREPARING THE FRAMEWORK OF THE CONFINED COLUMN

To prepare a column, observe the indicated minimum requirements.

4 Ø 3/8"

Hoops 1/4"



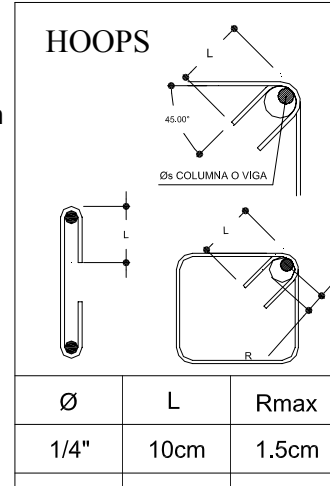
THE FRAMEWORK

Columns have 4 steel bars of at least 3/8". Column hoops are of 1/4" and are installed with the following spacement 1 @ 5 cm + 4 @ 10 cm + the others @ 25 cm, in each end

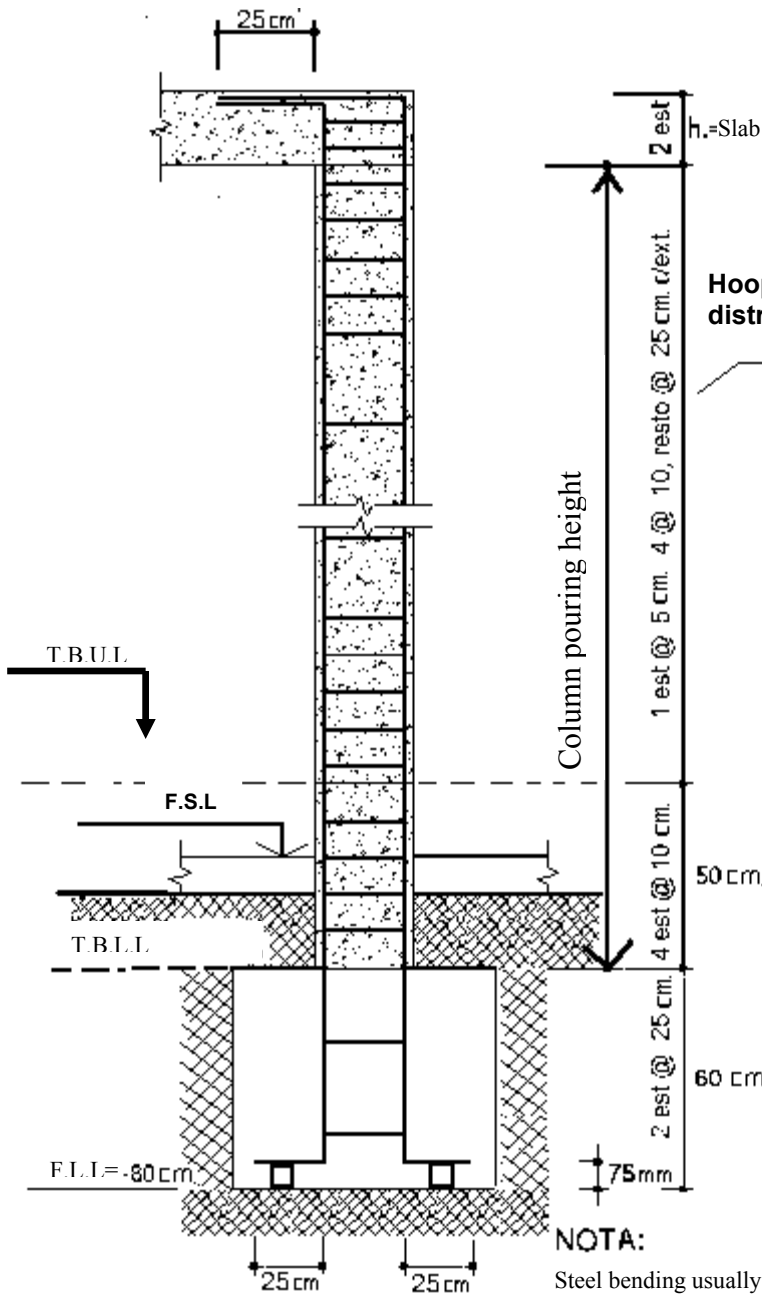
Try to install the bended part of the hoop in alternated position and never on the same column corner

4.2 PREPARING THE HOOPS

Hoops are made with steel bars of 1/4"



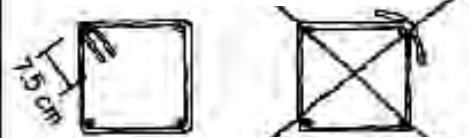
Hoops distribution



Bending of hoops

Correct

Incorrect



It is very important that ganchos are finally presented toward the inner side of the column so that it works well during the earthquake

Legend

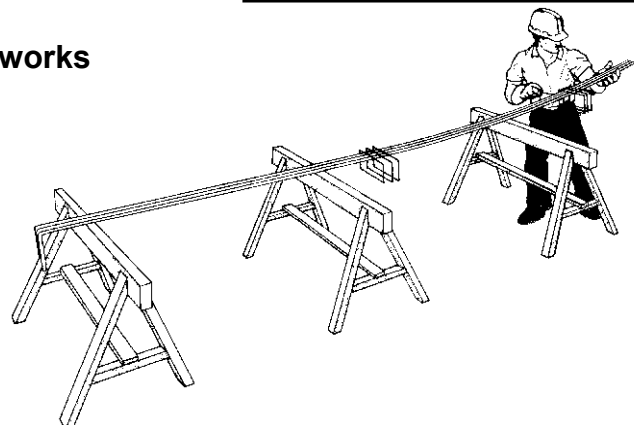
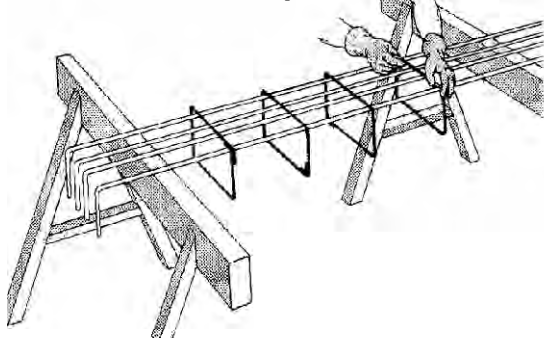
T.B.U.L.: Tie beam upper level

T.B.L.L.: Tie beam lower level

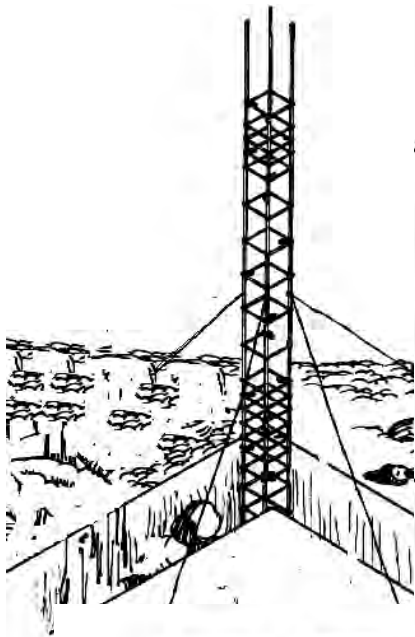
F.S.L.: Floor slab level

F.L.L.: Foundation lower level

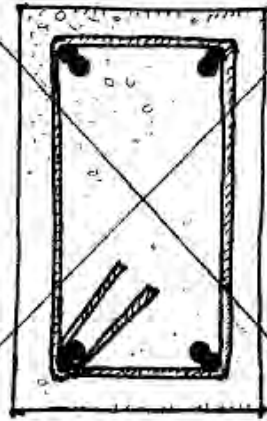
How to install hoops in column frameworks



4.3 IMPORTANT CONSIDERATIONS



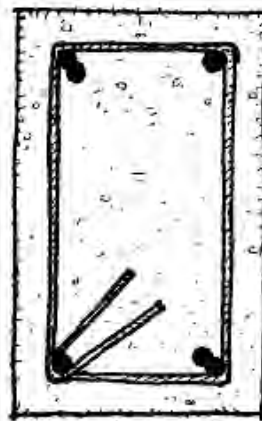
NO



100% overlap in one section

Overlap half of the steel bar at a column height and the other half in another height

YES

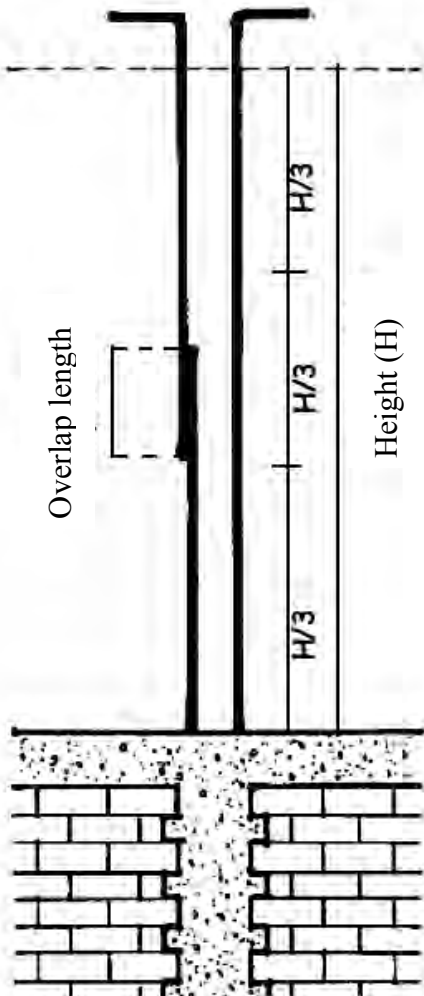


50% overlap in one section

Minimum covering: 2 cm

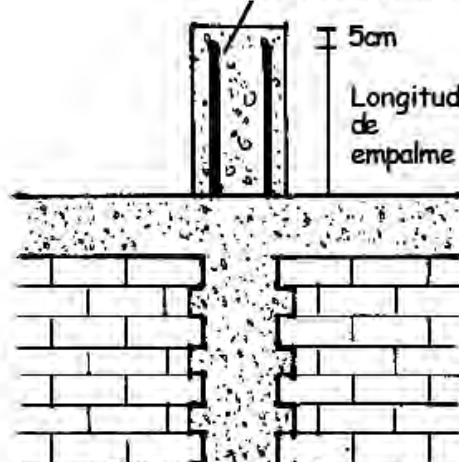
Never overlap 4 steel on the same section because this weak the column

Steel	Overlap length
3/8"	40 cm
1/2"	50 cm

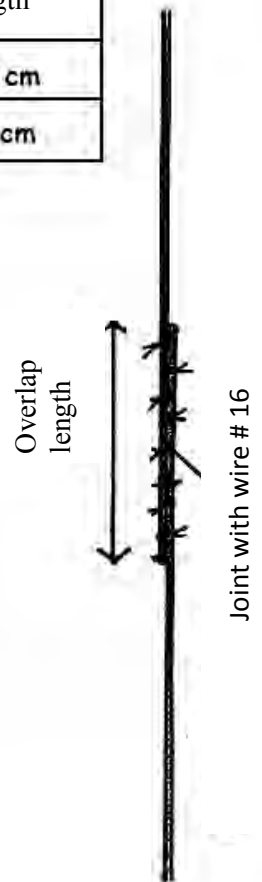


Overlap the steel bars in the central third of the free height of the column

Protect the column mechas with poor 1/10 concrete mix



In case of building only the first floor, leave some mechas for a future building of the second floor



CHAPTER 5: BUILDING FOUNDATION

MINIMUM REQUIREMENTS

1.0 Quality of materials

1.3. Foundation

- a) Mixture design for foundation is one (1) portion of Portland cement, ten (10) portions of hormigon, one and half (1.5) portions of water and three (3) portions of large stones (the size is maximum 10"). *Hormigon* is composed of gravel and coarse sand directly obtained from quarry place.

1.6. Water

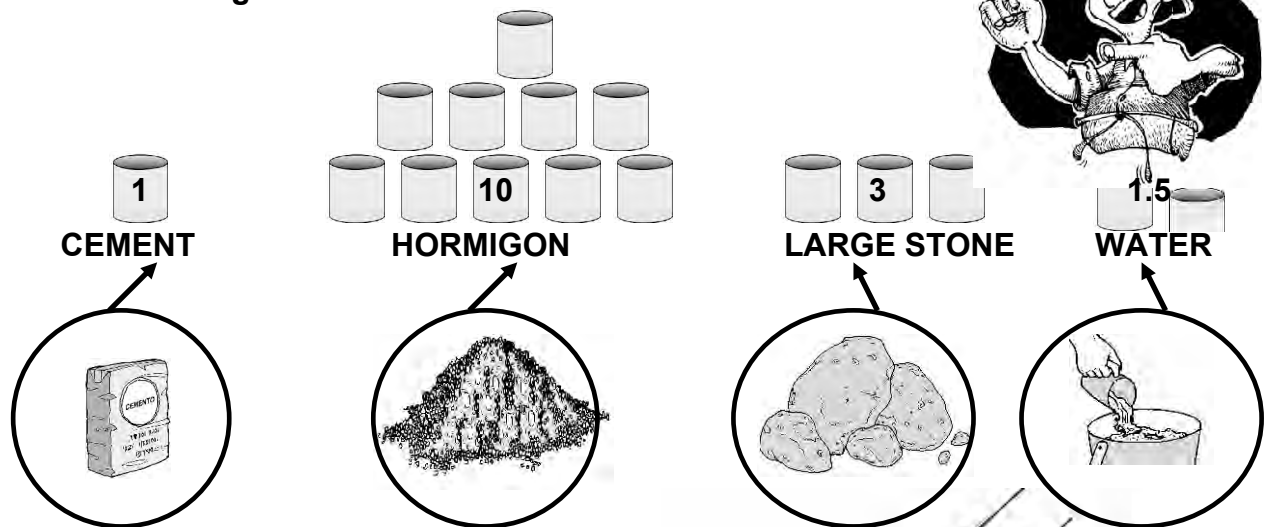
- a) Water is clean and drinkable

2.0 Structural Section of Main Members

2.2 Sections of reinforced concrete member

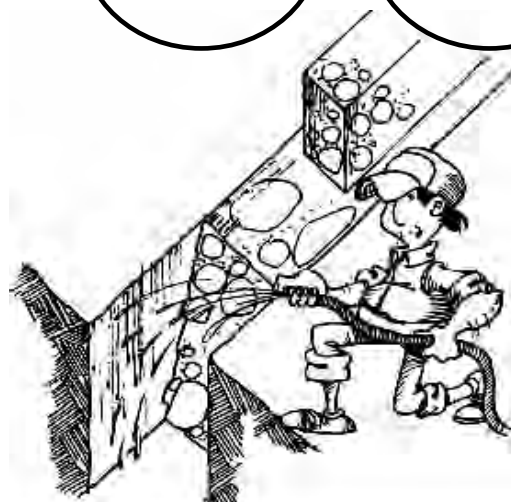
- a) Minimum covering depth of concrete is 20 mm for walls with finish and 30 mm for walls without finish. In case of foundation, covering depth is 75 mm.

For foundation we use Cyclops concrete, which has the following dossilification:



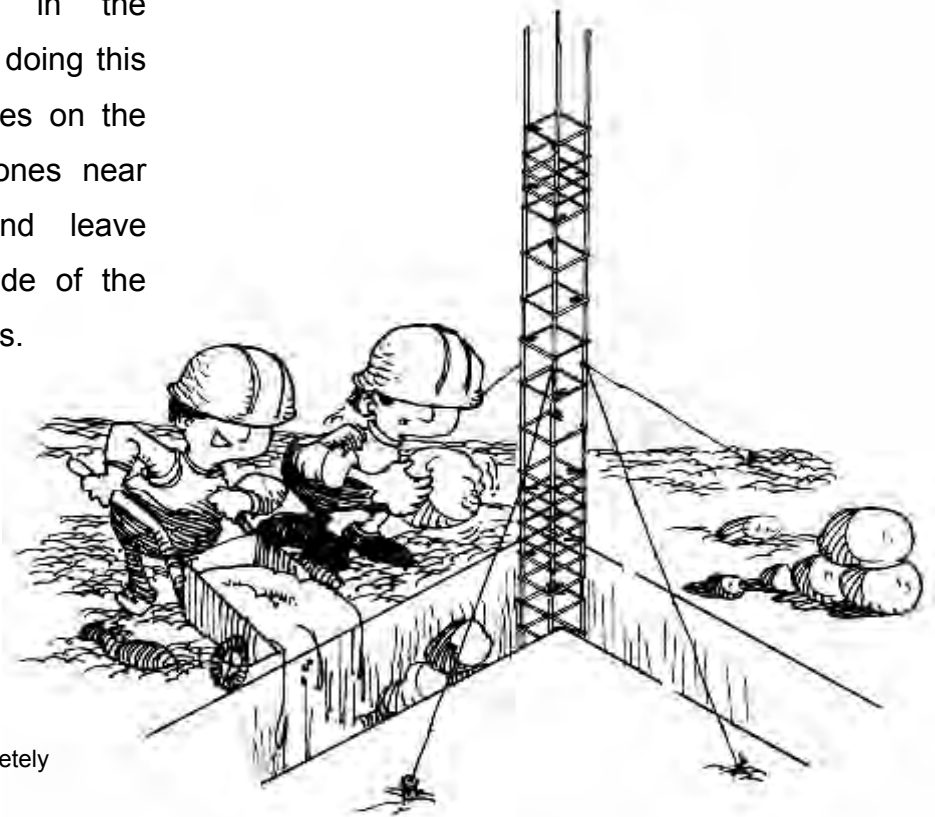
Ditch wetting

First, ditch is wetted before addition of foundation concrete.



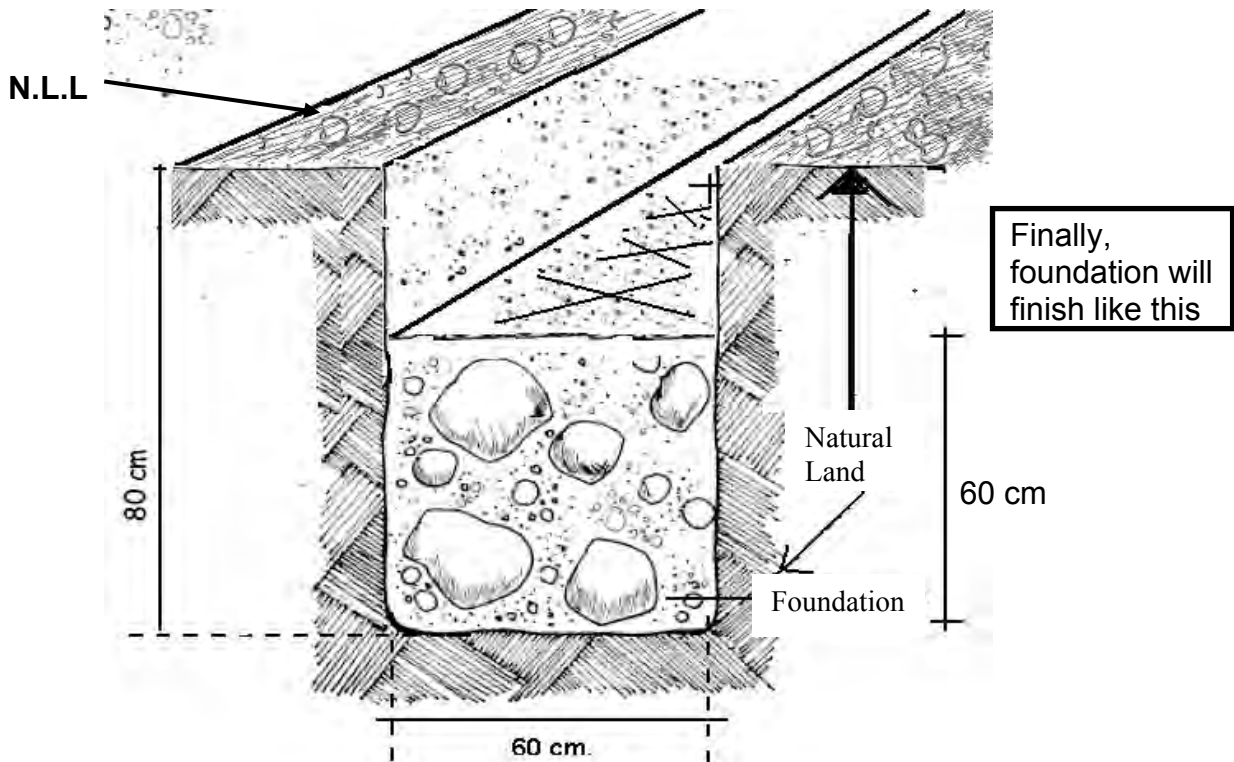
5.1 POURING MIX IN THE FOUNDATION

With the help of one-wheel cart or buggies pour concrete in the foundation. While you are doing this addition, throw large stones on the ditch. Don't put large stones near columns frameworks, and leave about 30 cm of every side of the column without large stones.



Be careful that every stone is completely covered with concrete.

Draw lines on the surface so that tie beam could adhere better



CHAPTER 6: MAKING FRAMEWORK FOR REINFORCED TIE BEAM

MINIMUM REQUIREMENTS

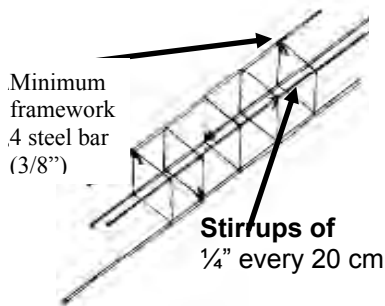
2. Structural Section of Main Members

2.2. Sections of reinforced concrete member

- a) Tie beam width is 13 cm or 24 cm according to the width of the wall. The minimum height is 50 cm. Tie beam is reinforced with four (4) steel bars of 3/8" diameter, with stirrups of 1/4" diameter at 20 cm intervals. If the soil is mainly composed of slime and/or sand, the tie beam is needed to be reinforced.

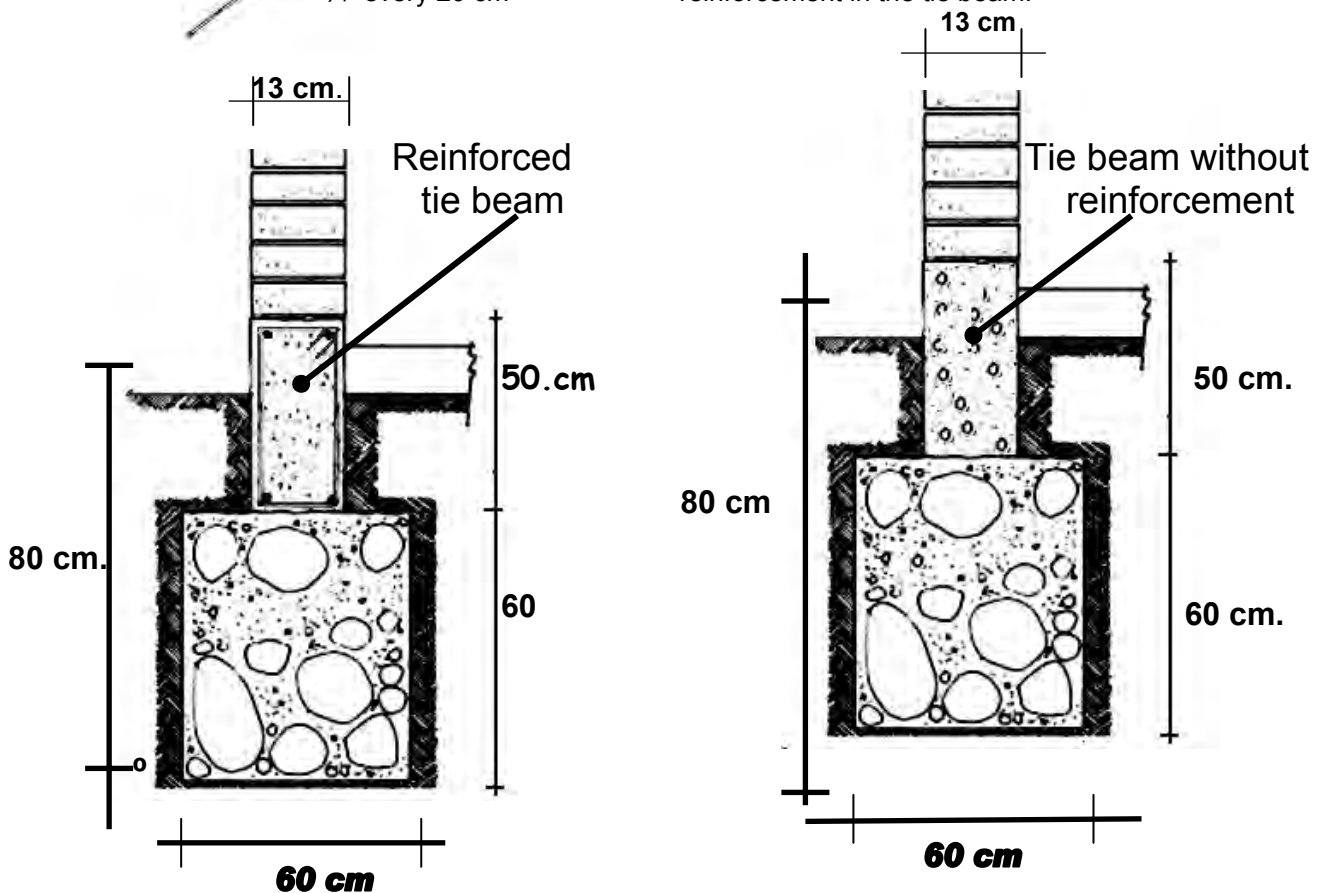
6.1 STEEL REINFORCEMENT IN TIE BEAM

When the soil of your land is sandy or limy, it is better to put reinforcement steel in tie beam.



6.2 TIE BEAM WITHOUT REINFORCEMENT

If your land has rocky or gravelly soil, it does not need reinforcement in the tie beam.



CHAPTER 7: MAKING FORMWORK FOR REINFORCED TIE BEAM

MINIMUM REQUIREMENTS

1.0. Quality of materials

1.4. Wood

- a) Wood is hard, dry, dense fiber, well cured, no crack and straight.

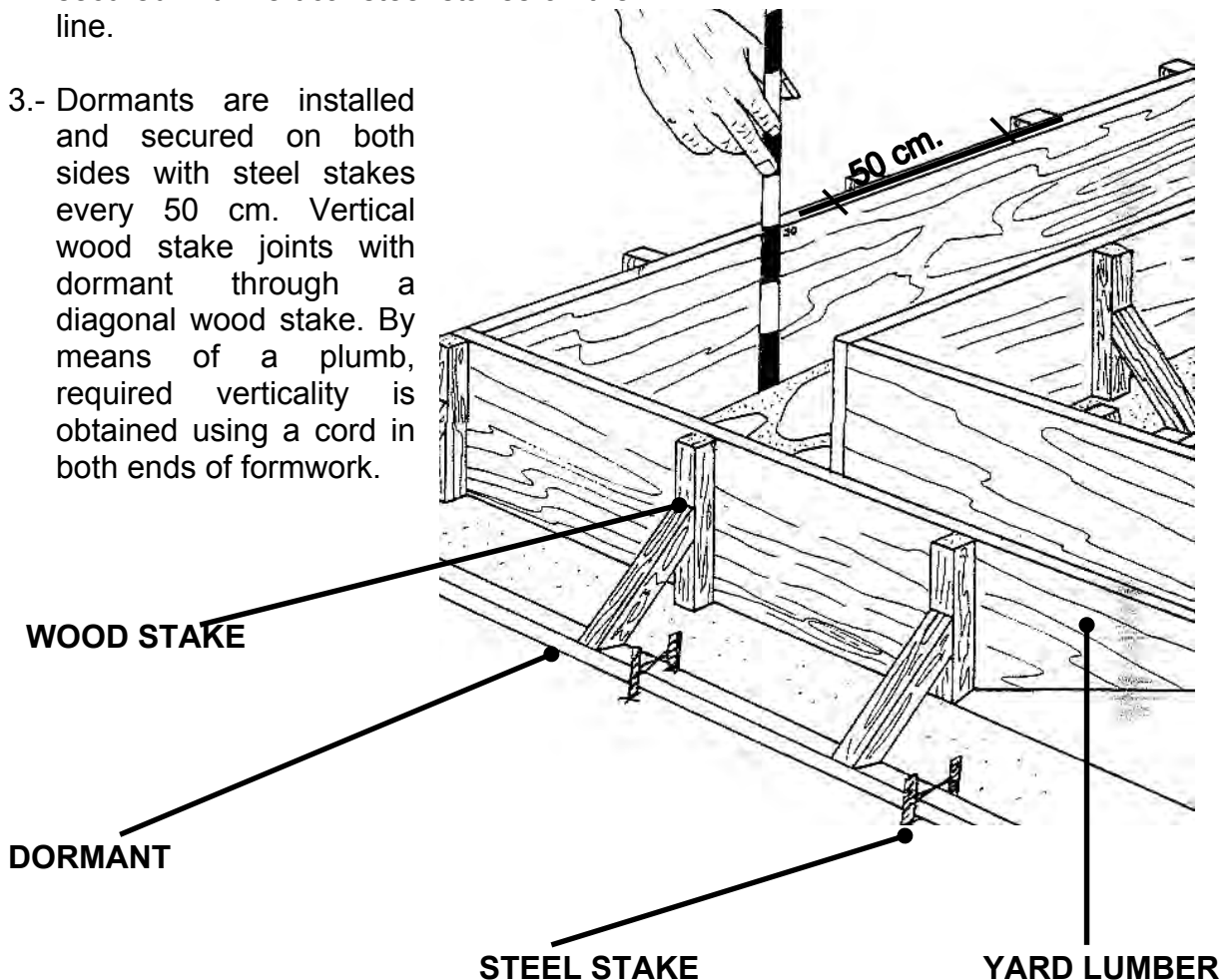
7.1 PREPARING FORMWORK IN THE TIE BEAM



1. Tie beam is traced according to the dimensions of the brick wall. Use a marker to mark the line on the foundation.

2.- Wood (yard lumber) are aligned and secured with vertical steel stakes all the line.

3.- Dormants are installed and secured on both sides with steel stakes every 50 cm. Vertical wood stake joints with dormant through a diagonal wood stake. By means of a plumb, required verticality is obtained using a cord in both ends of formwork.



CHAPTER 8: BUILDING THE TIE BEAM

MINIMUM REQUIREMENTS:

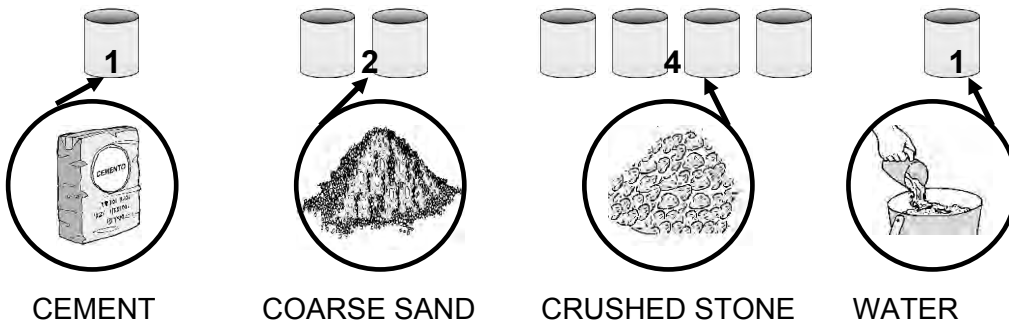
1.0 Quality of materials

1.6. Concrete

- Mixture design for reinforced tie beam is one (1) portion of Portland cement, two (2) portions of clean coarse sand, four (4) portions of crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water.
- Materials are well mixed where the aggregate is not visible and poured to form work immediately.
- Form work is hard and no bleeding.
- Any gaps and void is avoided by using a stick to compact concrete when it is pouring.

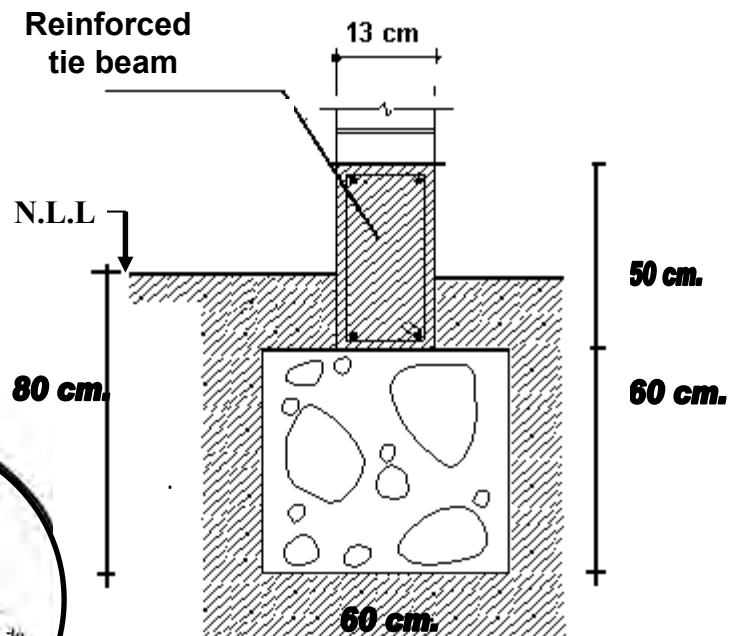
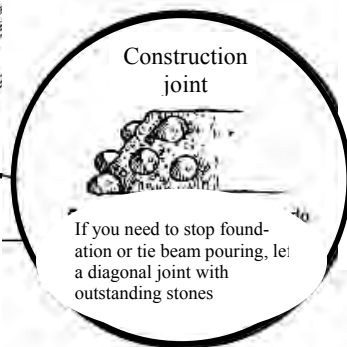
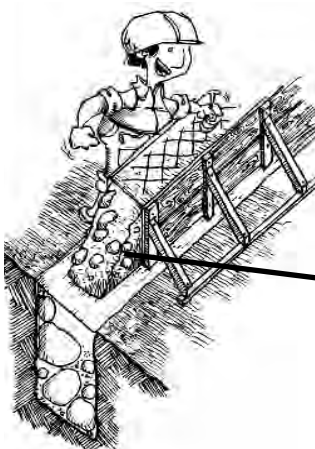
8.1 REINFORCED TIE BEAM.

Mixture design is:



NOTE

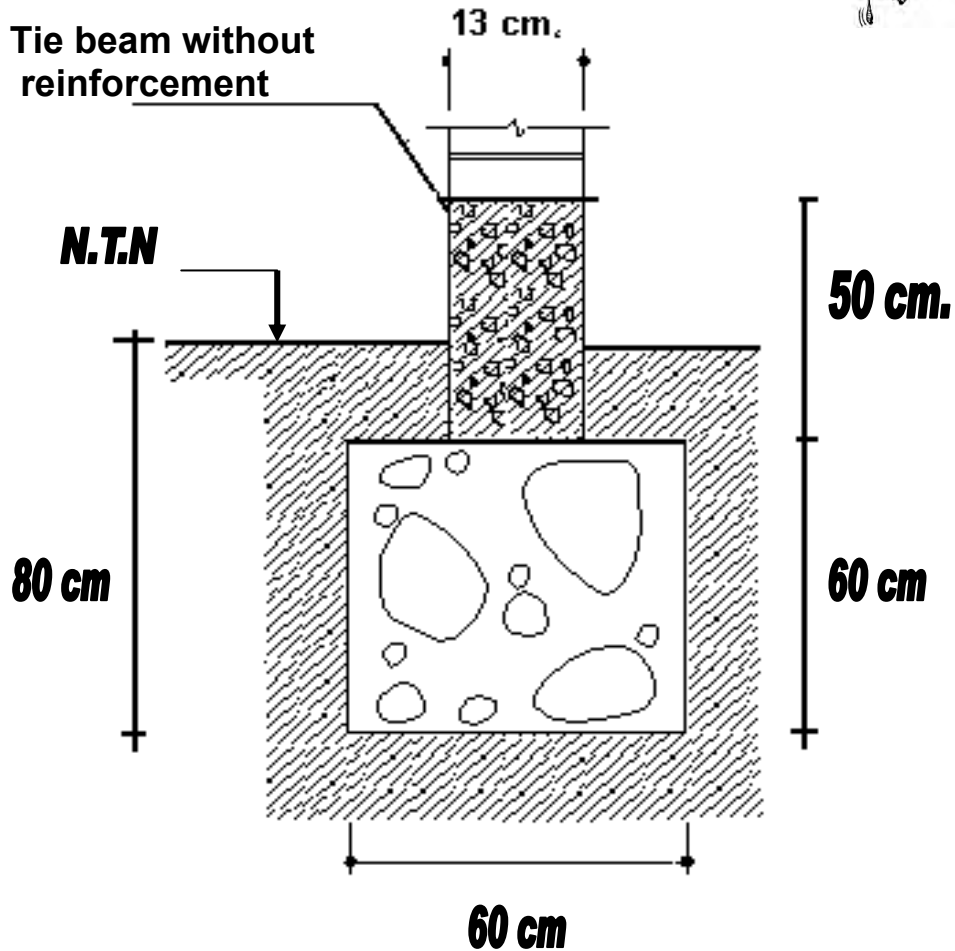
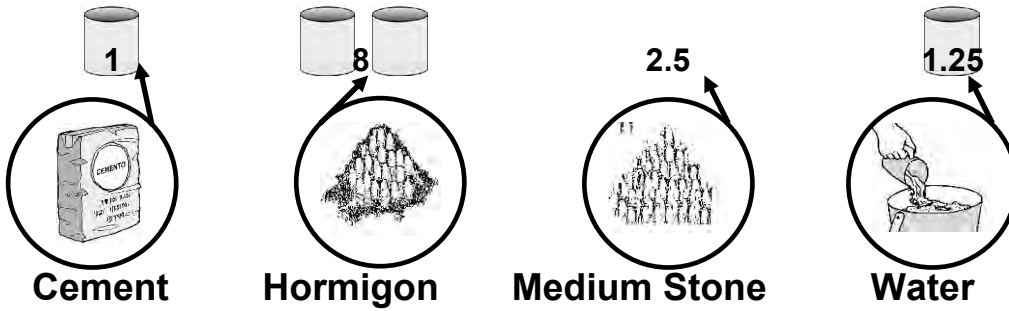
You can mix by hand the concrete for tie beams. Clean a plane zone for mixing, preferably on a concrete floor. Mix dry materials and then add water.



When the tie beam mix pouring is over, mark lines with a nail in order that the first raw of bricks can fix well.

8.1 TIE BEAM WITHOUT REINFORCEMENT

Mixture design is:



When the tie beam mix pouring is over, mark lines with a nail in order that the first raw of bricks can fix well.

CHAPTER 9: INSTALLING THE FIRST BRICK ROWS OF THE WALL

MINIMUM REQUIREMENTS:

1.0 Quality of materials

1.5. Brick.

- a) Brick is burned and orange color without white pale shadow. Brick is also dust free, without cracks or bending.

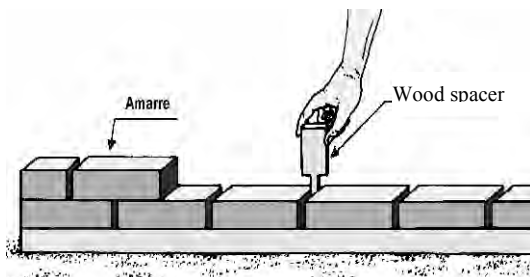
3.0 Connection of structural elements

3.4 Wall joint mortar thickness

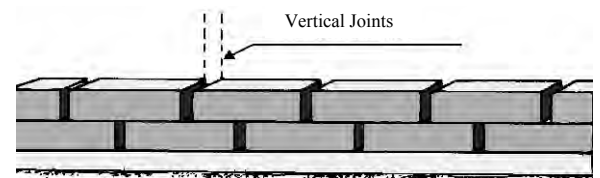
Thickness of joint mortar for wall is from 1.0 to 1.5 cm.

9.1 INSTALLING THE FIRST BRICK ROWS

Before the beginning of brick installation, show them in dry (without mortar) the first two brick rows; vertical joints uniformity is checked and solutions of intersections and joints between the wall and confined columns.



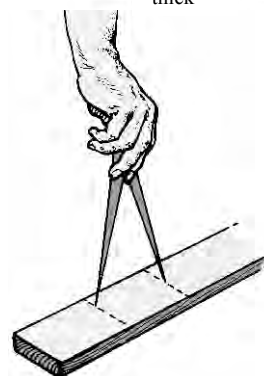
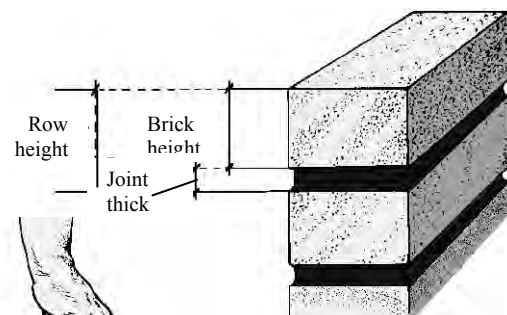
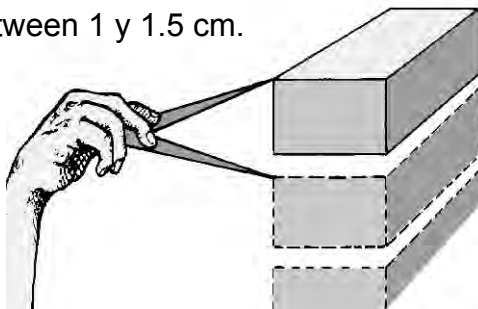
FIRST ROW



SECOND ROW

REMEMBER:

Prepare a Escantillon (vertical brick layer distribution ruler) to fix the height of the vertical joint between 1 y 1.5 cm.



CHAPTER 10: BUILDING THE WALL

MINIMUM REQUIREMENTS:

1.0 Quality of materials.

1.2 Mortar

- a) Mixture design is one (1) portion of Portland cement and four (4) portions of clean coarse sand.

1.5 Brick

- a) Brick is baked and orange color without white pale shadow. Brick is also dust free, without cracks or bending.

1.6. Water

- a) Water is clean and potable.

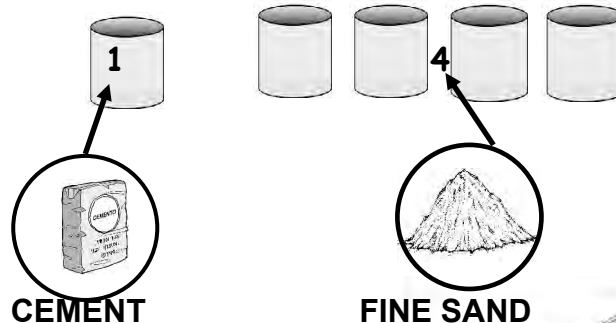
2.0 Structural Section of Main Members

Wall of confined masonry house is enclosed firmly with reinforced concrete tie beam, reinforced concrete column and reinforced concrete ring beam on a stable foundation with enough strength. Every vertical part of wall corner is firmly connected, forming confined elements.

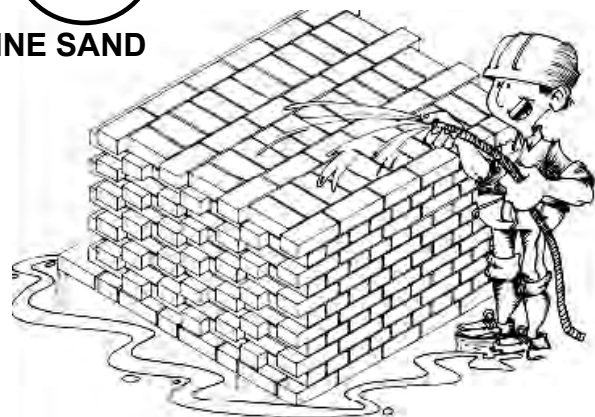
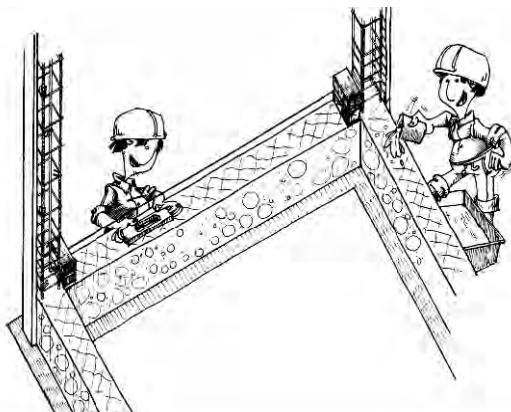
2.2 Sections of reinforced concrete member

- b) Maximum wall area framed with tie beam, column and ring beam is 12.0 m². The maximum height of the wall is 2.4 m.

10.1 Mix design for building a wall is:



Wet the upper part of the tie beam with a poor cement mix

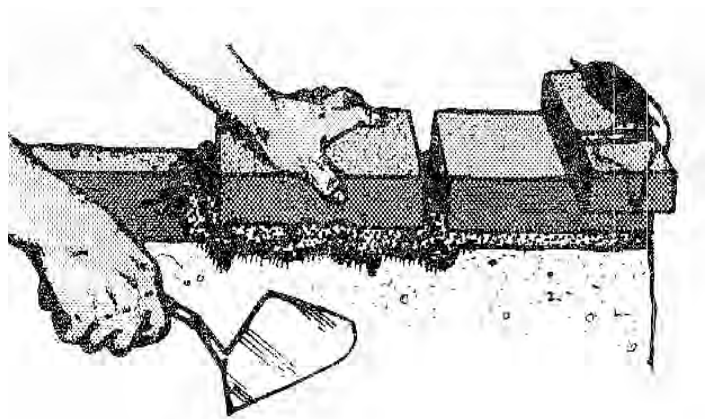


Brick Preparation

One day before the building of wall, clean the bricks, wet them with water for 20 minutes and then let them repose

10.2 INSTALLING BRICKS

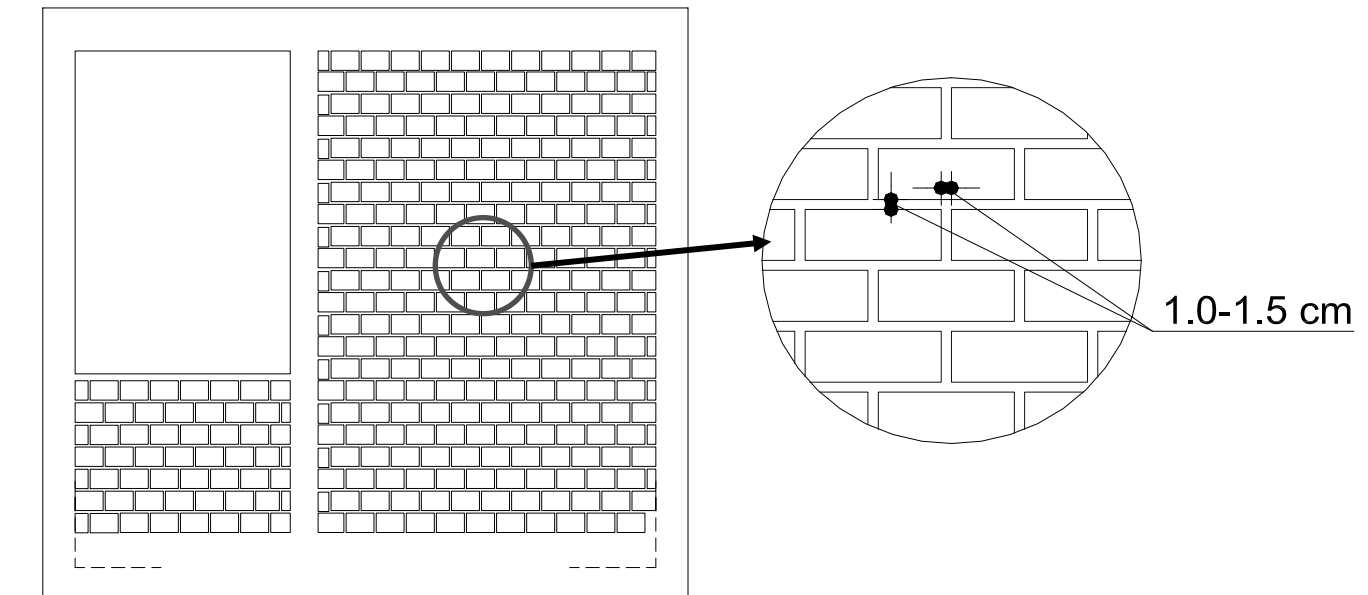
Install bricks in the final position they are going to be placed, joint to others with mortar, forming rows and keeping the joints alternated and uniform.



10.3 PLUMBING

Verify, in every row, the verticality of the wall with the plumb.

REMEMBER: The vertical and horizontal joint is from 1.0 to 1.5 cm, do not do wider or higher points because the wall is weakened.

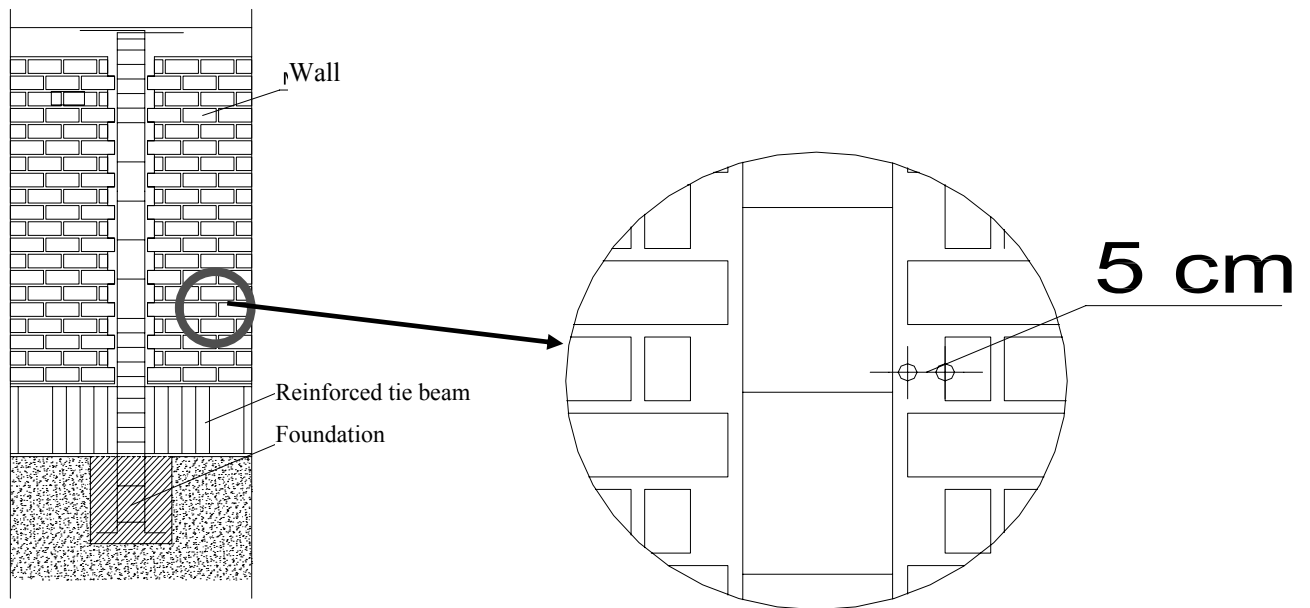


MINIMUM REQUIREMENTS:

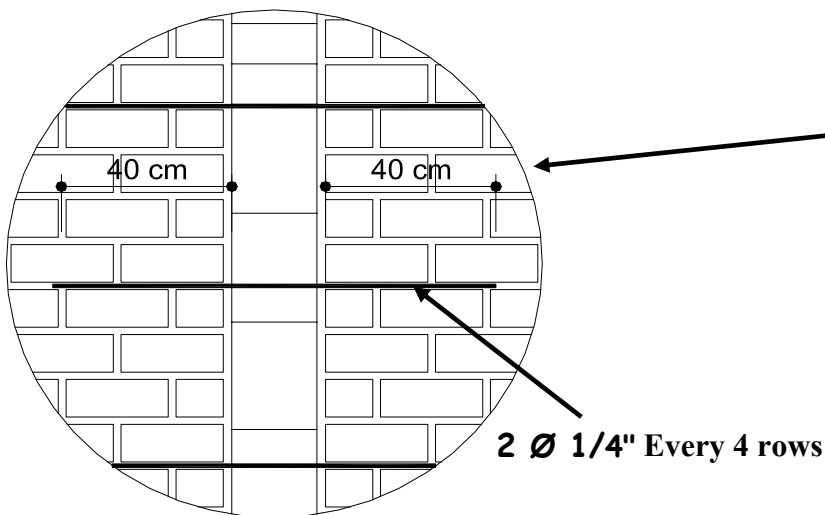
3.0. Structural elements conection

3.2. Wall – Column Conection.

There are two connection methods. One is that joint between wall and columns is geared and the length of the salient part of brick does not exceed 5 cm. The other is that two (2) steel bars of 1/4" diameter anchor at every four (4) layers of wall bricks at least 40 cm inside masonry and 12.5 cm inside column with vertical turning of 90° at 10 cm.



WALL-COLUMN DENTED CONNECTION DETAIL



WALL-COLUMN RASING CONNECTION DETAIL

CHAPTER 11: MAKING THE FRAMEWORK AND POURING THE MIX IN CONFINED COLUMNS

MINIMUM REQUIREMENTS

1.0. Quality of Materials

1.1 Concrete

- a) Mixture design for reinforced tie beam is one (1) portion of Portland cement, two (2) portions of clean coarse sand, four (4) portions of crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water. Mixture design for non reinforced tie beam is one (1) portion of Portland cement, eight (8) portions of hormigon, two and half (2.5) portions of medium stones (the size is maximum 4") and one and quarter (1.25) portions of clean and drinkable water. Mixture design for confined columns, ring beams and light slab is one (1) portion of Portland cement, two (2) portions of clean coarse sand, three (3) portions of clean crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water. In case of salty soil for foundation, vinyl sheet is used to prevent salt damage of concrete.
- b) Materials are well mixed where the aggregate is not visible and poured to form work immediately.
- c) Form work is hard and no bleeding.
- d) Any gaps and void is avoided by using a stick to compact concrete when it is pouring.

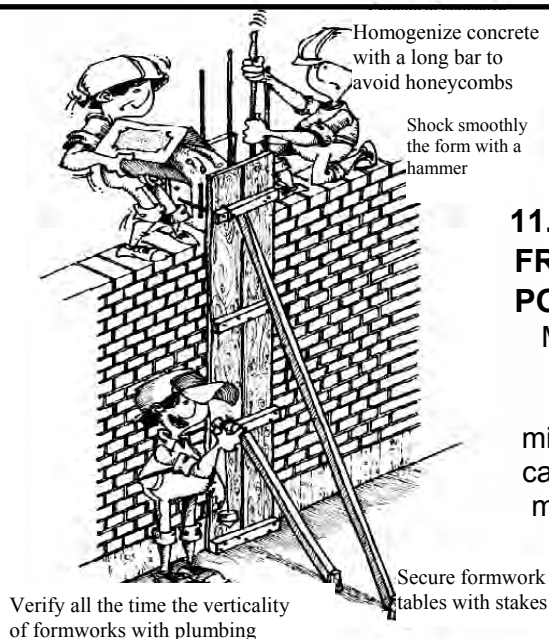
1.4 Wood

- a) Wood is hard, dry, dense fiber, well cured, no crack and straight.

2. 0. Structural Section of Main Members

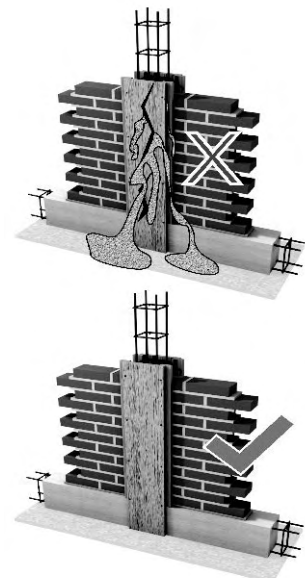
2.3 Maximum span

Maximum span of columns is 5.0 m in case of 24 cm wide wall. It is 3.5 m in case of 13 cm wide wall.

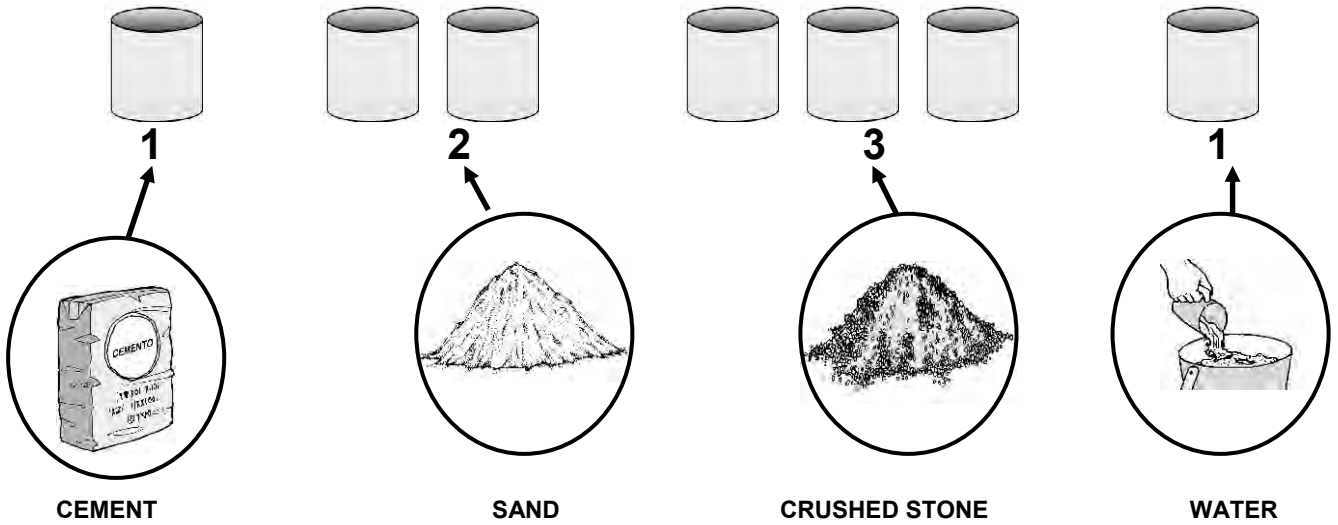


11.1. MAKING THE FRAMEWORK AND POURING THE MIX

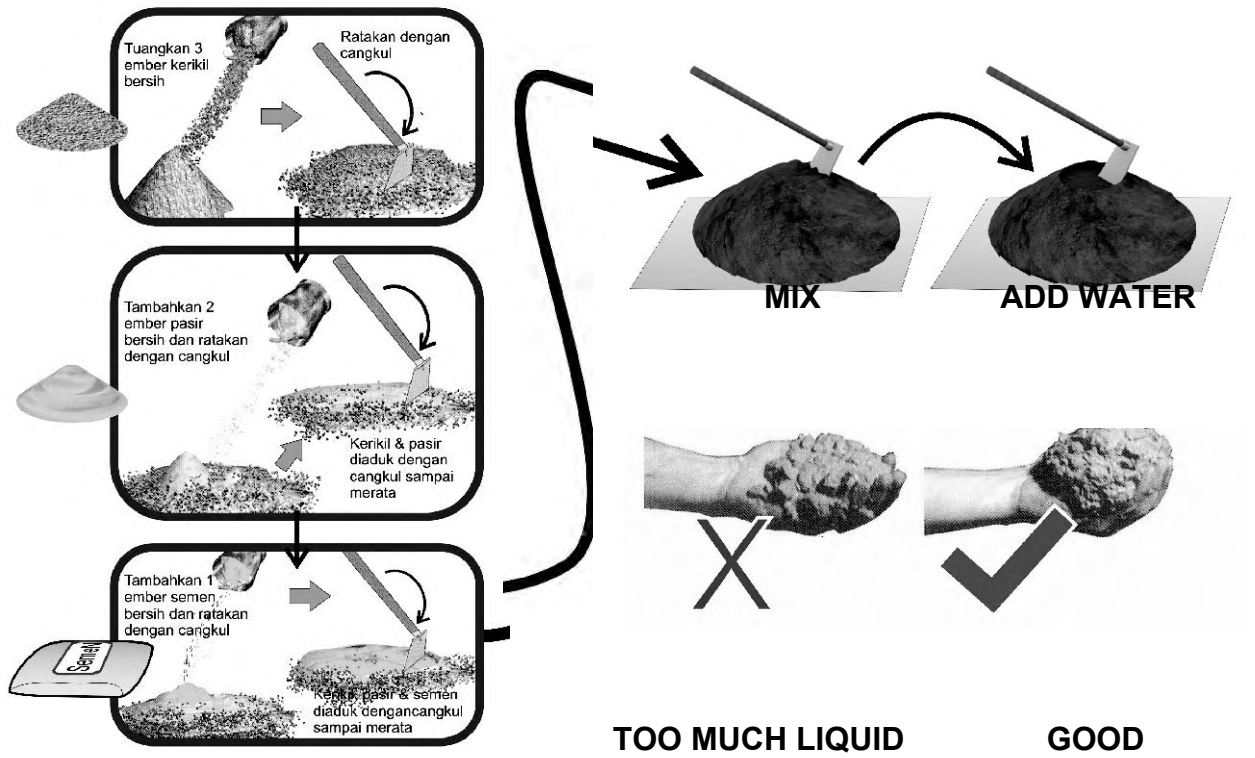
Make columns formwork after building walls. It's better to use a mixer to mix column concrete. Use cans to carry the mix from mixer to the upper part of the formwork. Pour the mix with care.



Mix design for confined column is:



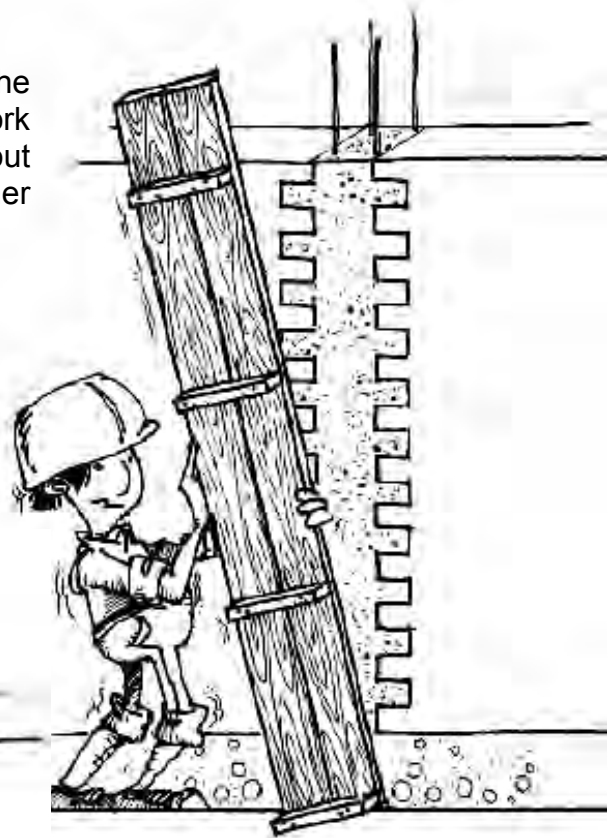
11.2 CONCRETE MIX



11.3 TAKING OUT THE FORMWORK

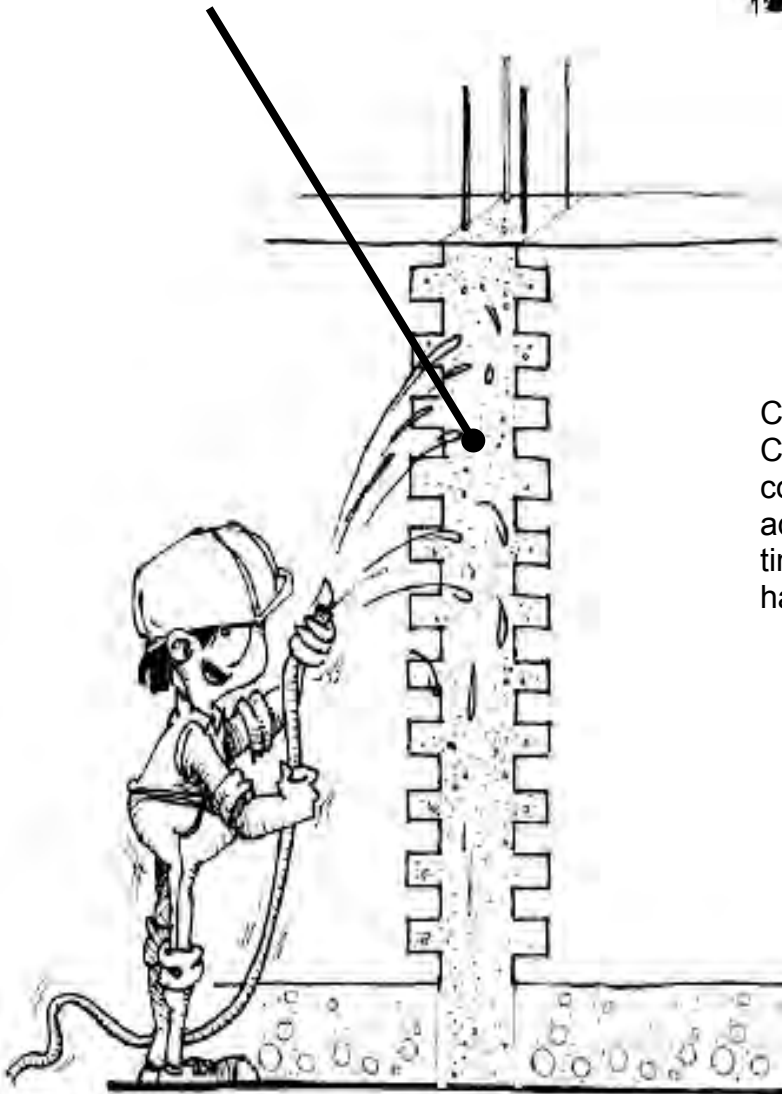
After pouring the concrete in the confinement columns, let the formwork in its place for 24 hours, then take out them and use them again for other columns.

Each element is cured at least for 7 days



Curing

Cure the concrete after taking out the columns formwork. Curing consist of adding water to concrete elements three times every day for better concrete hardening



CHAPTER 12: MAKING THE RING BEAM FORMWORK

MINIMUM REQUIREMENTS

1.0 Quality of materials

1.4 Wood

Wood is hard, dry, dense fiber, well cured, no crack and straight.

2.0 Structural Section of Main Members

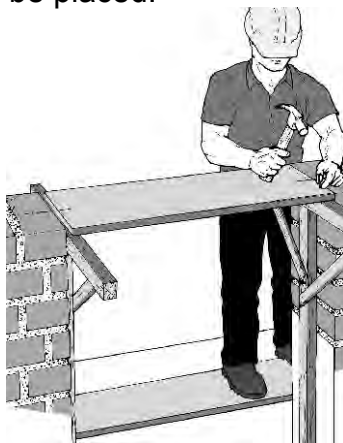
2.2 Sections of reinforced concrete member

d) Minimum dimension of ring beam is 13 cm wide and 20 cm high, and four (4) steel bars of 3/8" diameter are placed with stirrups of 1/4" diameter. Five (5) stirrups are placed from the connection point with column. First stirrup is placed at 5 cm from the connection point. The other four (4) stirrups beside the first stirrup are placed at 10 cm interval. Another five (5) stirrups are placed from the connection point with the other column as the same case from the connection of the other above mentioned column. At the rest space of ring beam space stirrups are placed at 25 cm interval.

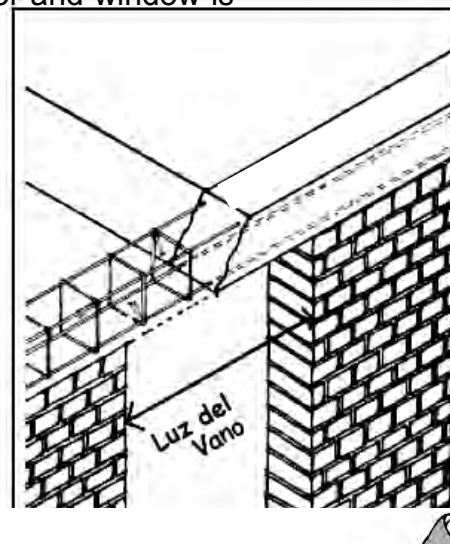
e) Minimum covering depth of concrete is 2 cm for walls with finish and 3 cm for walls without finish. In case of foundation, covering depth is 7.5 cm.

12.1 MAKING THE DINTEL BEAM

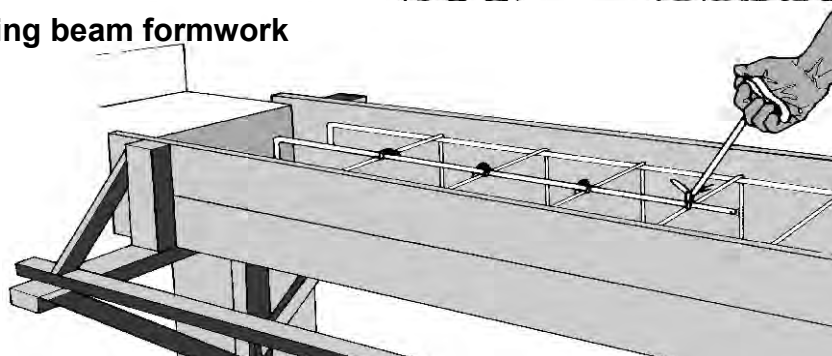
After finishing with the column filling, you have to make formworks for void spaces where the door and window is going to be placed.



Ring beam formwork



Ring beam



CHAPTER 13: MAKING THE FRAMEWORK FOR RING BEAM

MINIMUM REQUIREMENTS

2.0 Structural Section of Main Members

2.2 Sections of reinforced concrete member

- d) Minimum dimension of ring beam is 13 cm wide and 20 cm high, and four (4) steel bars of 3/8" diameter are placed with stirrups of 1/4" diameter. Five (5) stirrups are placed from the connection point with column. First stirrup is placed at 5 cm from the connection point. The other four (4) stirrups beside the first stirrup are placed at 10 cm interval. Another five (5) stirrups are placed from the connection point with the other column as the same case from the connection of the other above mentioned column. At the rest space of ring beam space stirrups are placed at 25 cm interval.

3.0 Connection of Structural Members

3.1 Anchor of column to tie beam and ring beam

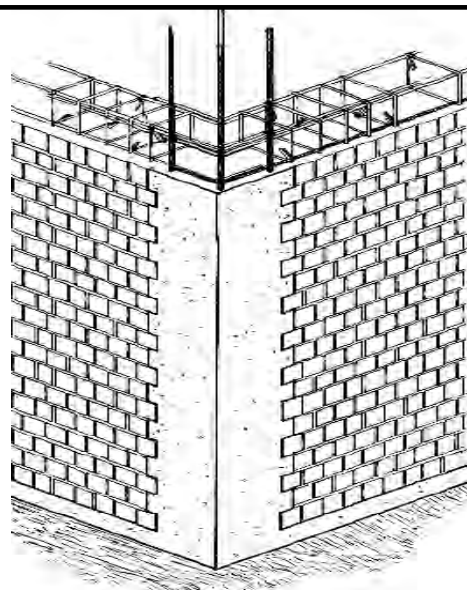
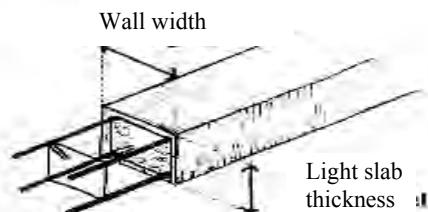
- a) Four (4) steel bars of column anchor to the foundation. The steel bars bend 90° at 7.5 cm from the bottom of foundation. The bended steel bars are prolonged 25 cm. In order to connect steel bars of column and tie beam, additional four (4) steel bars connect with each column bar that anchors to the foundation. The additional bars bend 90° at 4 cm from the bottom of tie beam. The bended steel bars are prolonged 25 cm measured from the column surface. In case of good soil, concrete without reinforcement is used and the four (4) steel bars of column anchor to the foundation. In the same way, four (4) steel bars of column anchor to reinforced ring beam. The steel bars bend 90° at 2 cm from the top of ring beam. The bended steel bars are prolonged 25 cm measured from the column surface.

13.1 RING BEAMS

Ring beams are important because they help to confine walls. Ring beams are placed over the walls.

Minimum reinforcement

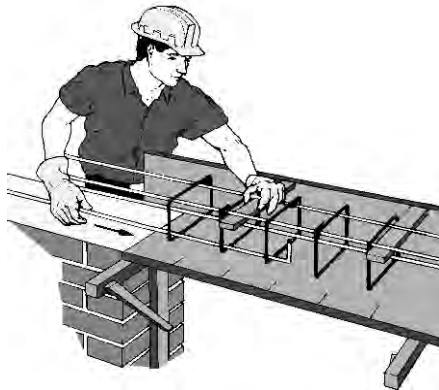
The minimum reinforcement for all types of beams is: four 3/8" steel bar for main framework; 1/4" stirrups are placed in each end one at 5 cm, 4 at 10 cm and the rest at 25 cm.



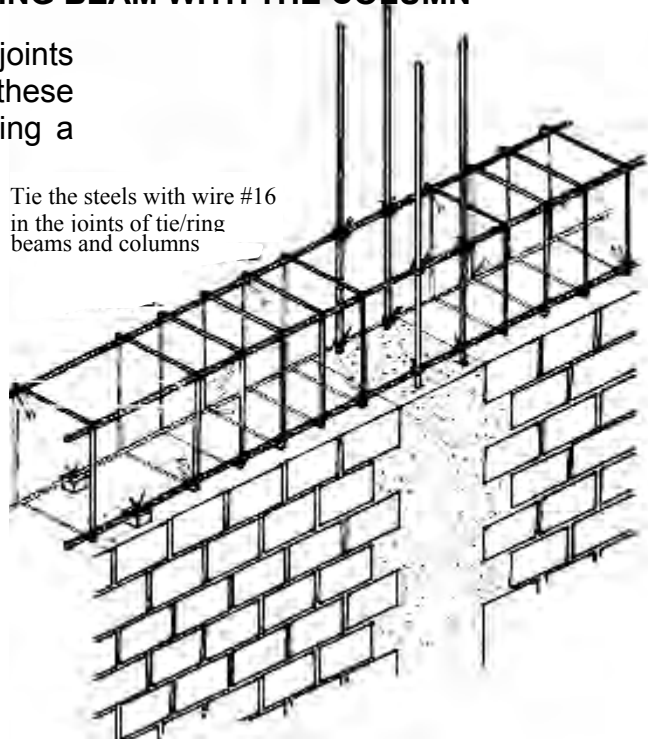
Never stop concrete pouring in ring beams!

13.2 JOINING THE TIE BEAM AND RING BEAM WITH THE COLUMN

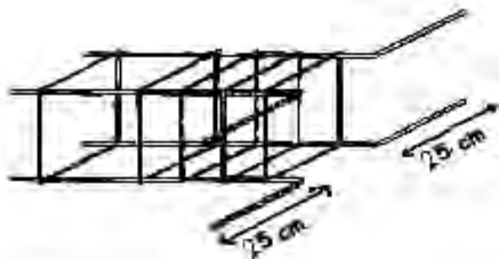
Place with care the frameworks in the joints of beams and columns. When filling these parts with concrete avoid gaps by using a steel bar.



Tie the steels with wire #16 in the joints of tie/ring beams and columns



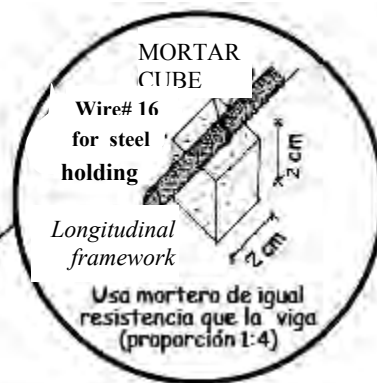
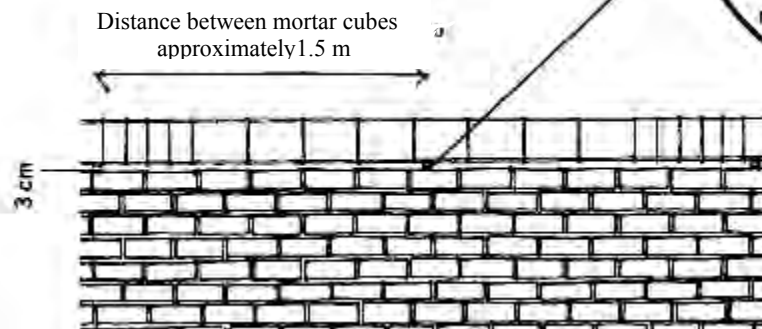
In case the tie/ring beam doesn't continue, bend the steel in a horizontal way



The length of the bending of the reinforcement steel tie/ring beams should be 25 cm

Ring/Tie beams spaciators

For keeping the ring/tie beams steels in horizontal position, put below them mortar cubes of 2 cm side.



Use mortar with

CHAPTER 14: MAKING THE LIGHT SLAB FORMWORK

MINIMUM REQUIREMENTS

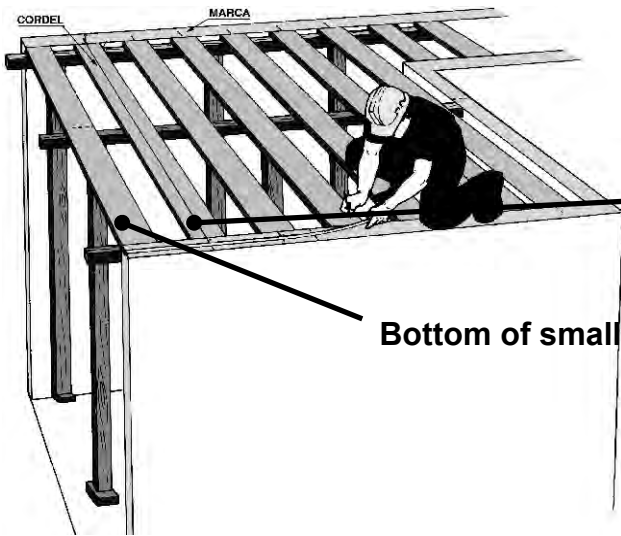
1. Quality of Materials

c) Form work is hard and no bleeding.

1.4 Wood

a) Wood is hard, dry, dense fiber, well cured, no crack and straight.

14.1 FIXING THE BOTTOM OF SMALL BEAM



Mark the axis of small beams

Bottom of small beam

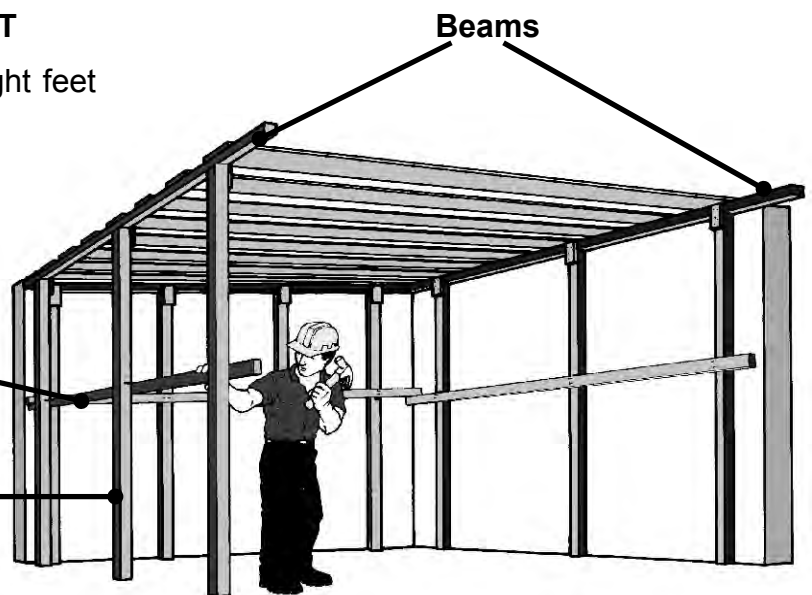


14.2 SECURING THE RIGHT FEET

Determine the place where right feet are going to be.

Yard lumber for securing right feet

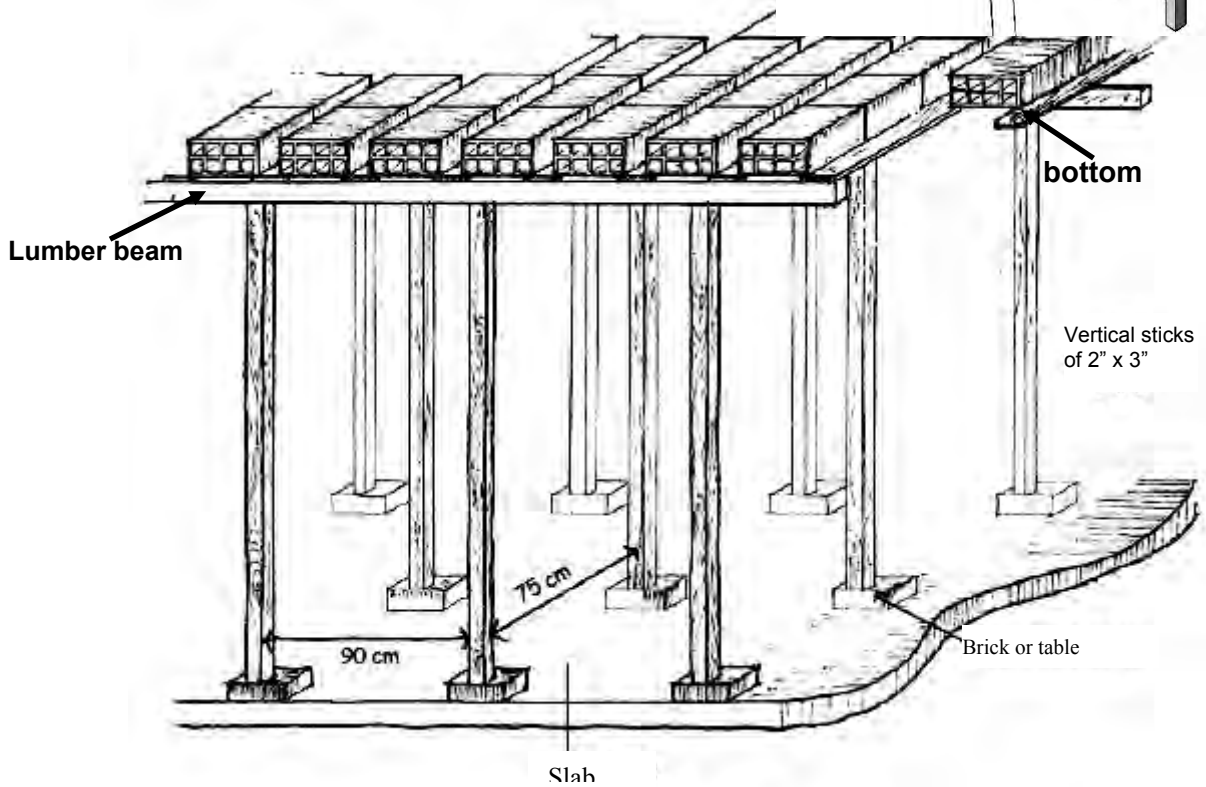
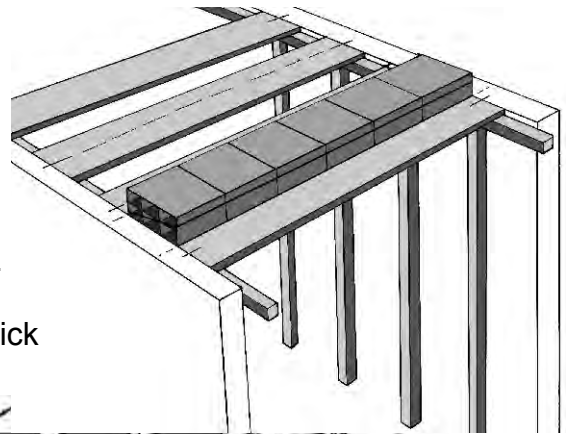
Right foot



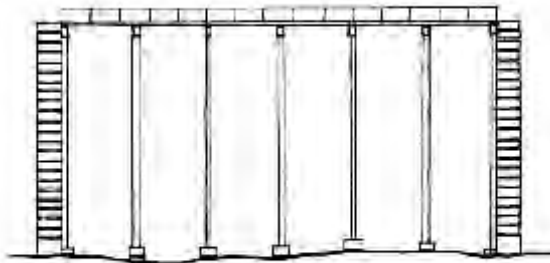
14.2 INSTALLING THE BRICKS ON THE ROOF

- a. Locate the axis of small beams
- b. Place bricks with holes so that they are in parallel to the woods

Build the formwork for the slab with lumber yard of at least 1 inch thickness, for the bottoms of small beams. Said woods are supported on lumber of 2" thick x 3" width that are supported by vertical sticks of 2" x 3" thick x 3" width.

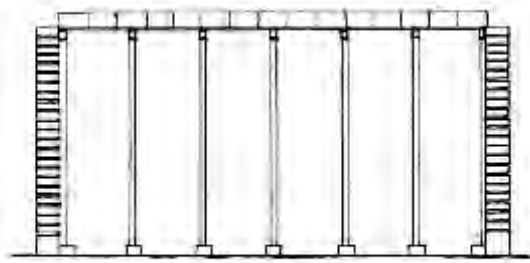


NO



Never put the light slab formwork over soil without compacting

YES



It's advisable to build slab before installing the light slab formwork. If there isn't a slab, soil should be very well compacted and leveled.

CHAPTER 15: MAKING THE FRAMEWORK FOR LIGTH SLAB

MINIMUM REQUIREMENTS

2.0. Structural Section of Main Members

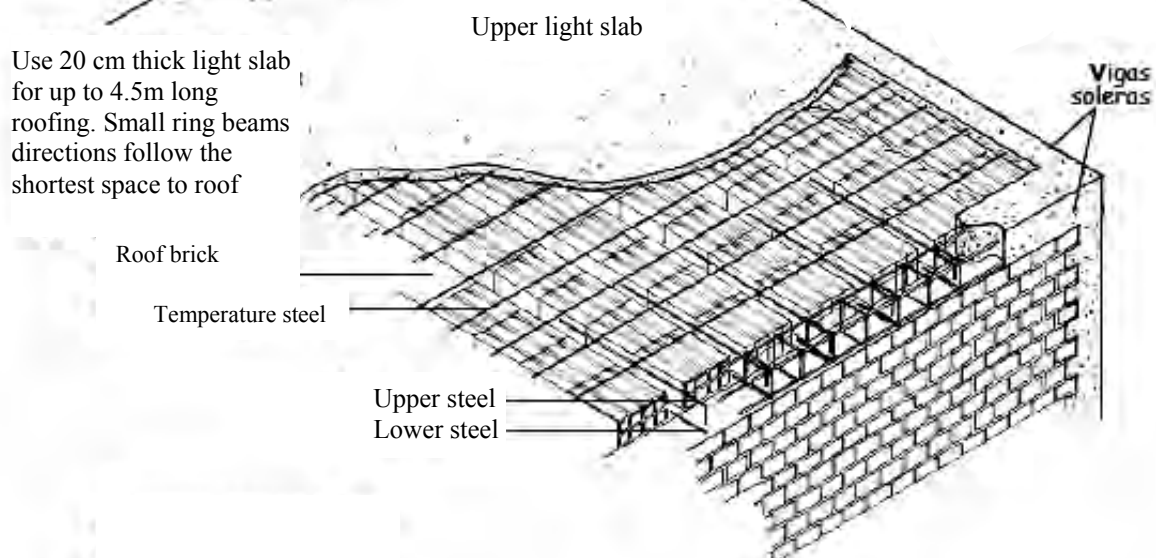
2.2 Sections of reinforced concrete member

d). Minimum dimension of ring beam is 13 cm wide and 20 cm high, and four (4) steel bars of 3/8" diameter are placed with stirrups of 1/4" diameter. Five (5) stirrups are placed from the connection point with column. First stirrup is placed at 5 cm from the connection point. The other four (4) stirrups beside the first stirrup are placed at 10 cm interval. Another five (5) stirrups are placed from the connection point with the other column as the same case from the connection of the other above mentioned column. At the rest space of ring beam space stirrups are placed at 25 cm interval.



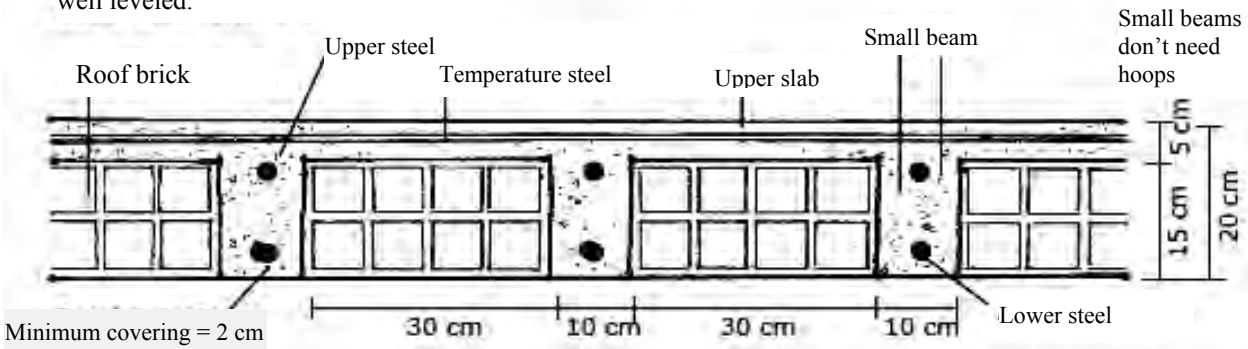
Ligth slab components

Ligth slabs are formed by small beams separated at 40 cm from axis to axis. Between beam and beam light bricks 30 cm wide 15 cm high are placed. A 5 cm thick concrete is poured on the upper part.



Components dimensions

Roof bricks should be perfectly aligned and the slight slab should also be very well leveled.

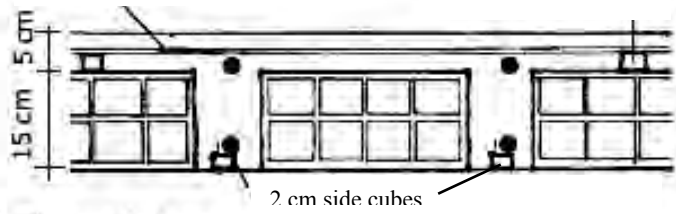
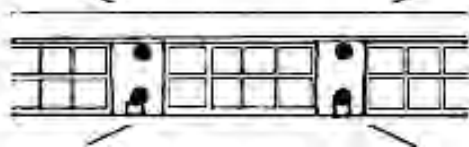


Temperature steel

To avoid that upper slight slab cracks due to temperatura effect, 1/4" steel bars are placed perpendicularly to the small beams every 25 cm.

Temperature steel is placed i the center of the upper light slab

Prepare 2 cm side cubes and use them to support the small beam steel

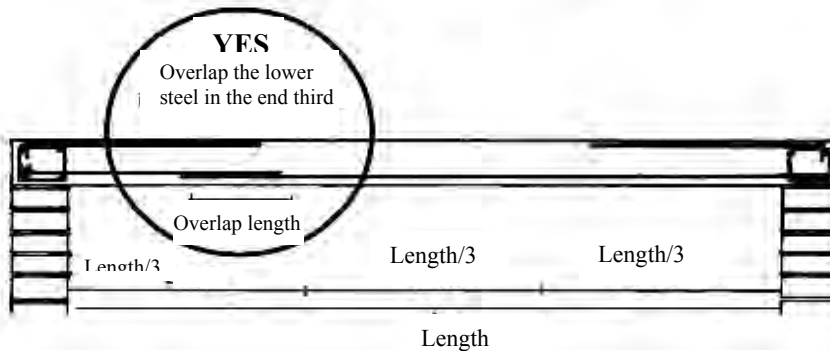
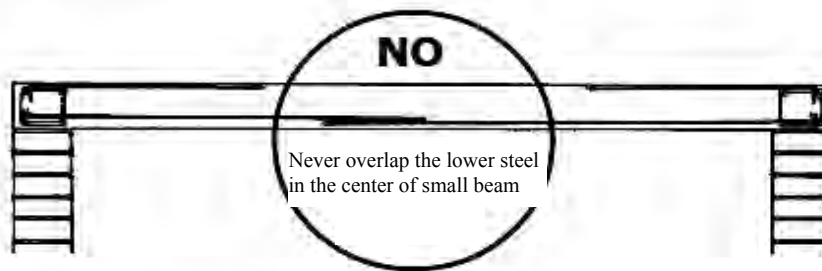


NO! Steel temperature should not be in contact with the roof brick.

Overlaps of small beams reinforce

If you need to overlap the lower steel (positive) o the smalll beam, do the overlaps in the third part of the bar end.

Steel	Overlapping length
3/8"	40 cm
1/2"	50 cm



CHAPTER 16: BUILDING LIGHT SLAB

MINIMUM REQUIREMENTS

1.0 Quality of Materials

1.1 Concrete

- a) Mixture design for confined columns, ring beams and light slab is one (1) portion of Portland cement, two (2) portions of clean coarse sand, three (3) portions of clean crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water.

In case of salty soil for foundation, vinyl sheet is used to prevent salt damage of concrete.

- b) Materials are well mixed where the aggregate is not visible and poured to form work immediately.
- c) Form work is hard and no bleeding.
- d) Any gaps and void is avoided by using a stick to compact concrete when it is pouring.

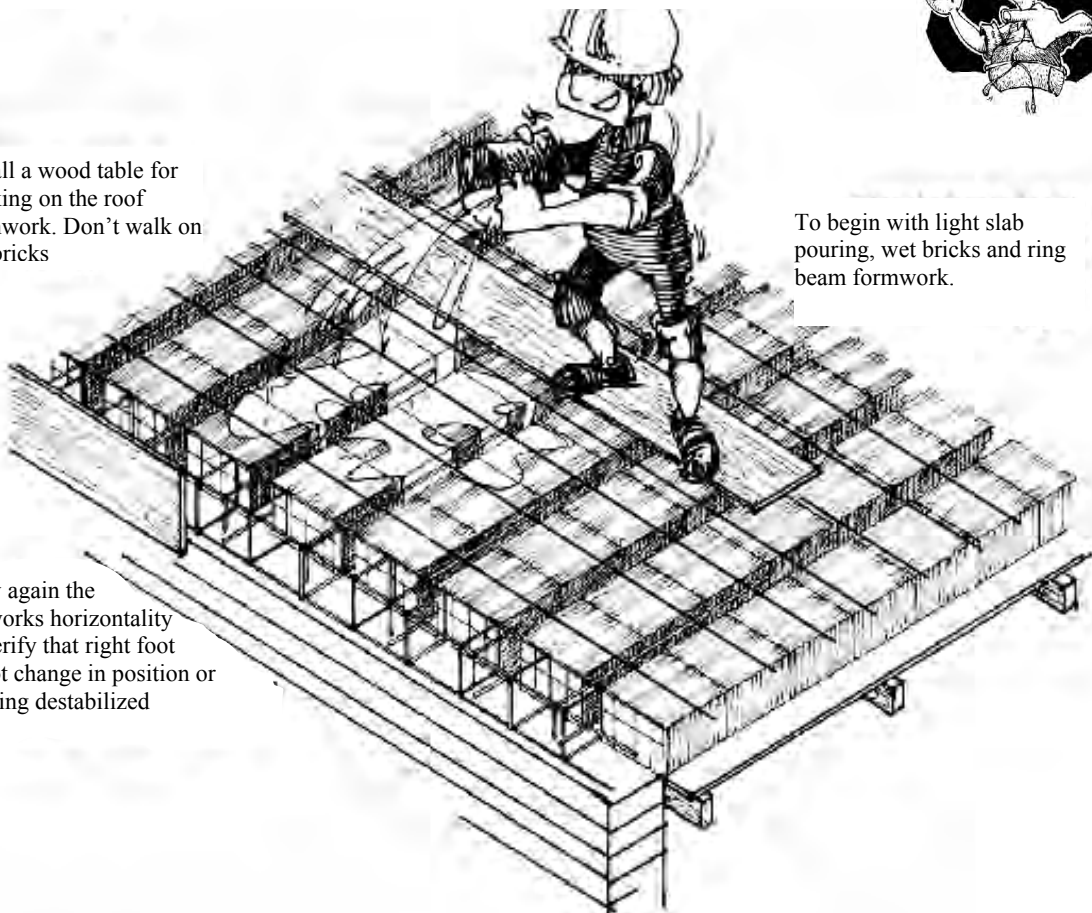
16.1 Previous work before pouring concrete in the slab



Install a wood table for walking on the roof formwork. Don't walk on the bricks

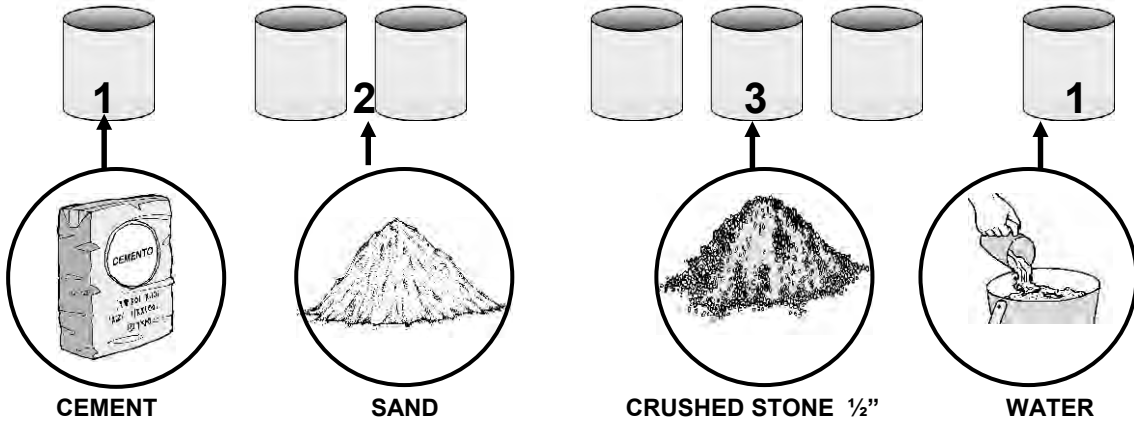
To begin with light slab pouring, wet bricks and ring beam formwork.

Verify again the formworks horizontality and verify that right foot has not change in position or not being destabilized



16.2 POURING CONCRETE IN SLABS AND RING BEAMS

Mixture design for slab mix is:



Fill the lighth slab and the ring beams at the same time because it is important that they work jointly. Fill the slab by sections. Begin filling the ring beam, then fill the small beams and finally the upper slab. It is better to hire a mixer machine for concrete mixing. This will help you reduce the slab filling time and will help some saving in materials.

tener mucho de entrar juntos. ocar

Wood lumber

Use cans to carry concrete over from mixer to ring beam or light slab

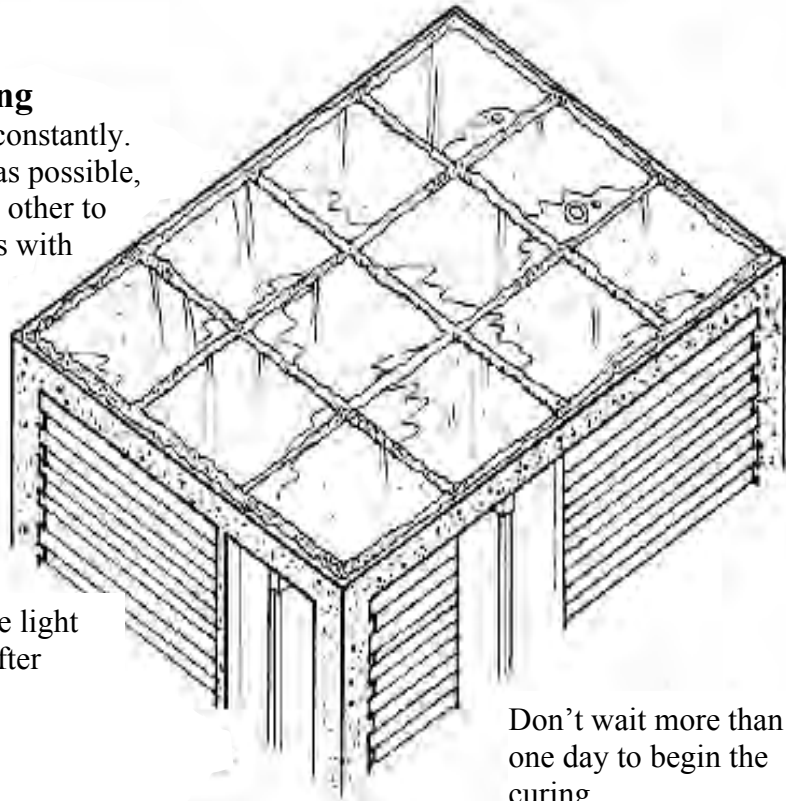
It's better to use a vibrator for light slab and ring beam concrete pouring. If not possible, homogenize carefully the concrete mix

Pour concrete mix with care. Avoid stepping on electricity or water pipes

During ring beam pouring knock the lateral side of the formwork to avoid concrete honey crumbs

Light slab curing

Light slab should be cured constantly. Curing must begin as soon as possible, do not wait from one day to other to begin it. Form closed spaces with sand cordons and fill them with water. Light slab should be cured for at least seven days.



Don't do any work over the light slab for at least two days after concrete pouring.

Don't wait more than one day to begin the curing

3. MINIMUM REQUIREMENTS

(Annex 1)

Minimum Requirements for Safer Housing

JICA Study Team

1. Quality of Materials
2. Structural Section of Main Members
3. Connection of Structural Members

1. Quality of Materials

1.1 Concrete

- a) Mixture design for reinforced tie beam is one (1) portion of Portland cement, two (2) portions of clean coarse sand, four (4) portions of crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water. Mixture design for non reinforced tie beam is one (1) portion of Portland cement, eight (8) portions of hormigon, two and half (2.5) portions of medium stones (the size is maximum 4") and one and quarter (1.25) portions of clean and drinkable water.

Mixture design for confined columns, ring beams and light slab is one (1) portion of Portland cement, two (2) portions of clean coarse sand, three (3) portions of clean crushed stone (the size is less than 1/2") and one (1) portion of clean and drinkable water.

In case of salty soil for foundation, vinyl sheet is used to prevent salt damage of concrete.

- b) Materials are well mixed where the aggregate is not visible and poured to form work immediately.
- c) Form work is hard and no bleeding.
- d) Any gaps and void is avoided by using a stick to compact concrete when it is pouring.

1.2 Mortar

- a) Mixture design is one (1) portion of Portland cement and four (4) portions of clean coarse sand.

1.3 Foundation

- a) Mixture design for foundation is one (1) portion of Portland cement, ten (10) portions of hormigon, three (3) portions of large stones (the size is maximum 10") and one and half (1.5) portions of clean and drinkable water.

Hormigon is composed of gravel and coarse sand directly obtained from quarry place

1.4 Wood

- a) Wood is hard, dry, dense fiber, well cured, no crack and straight.

1.5 Brick

- a) Brick is baked and orange color without white pale shadow. Brick is also dust free, without cracks or bending.

1.6 Water

- a) Water is clean and drinkable.

2. Structural Section of Main Members

Wall of confined masonry house is enclosed firmly with reinforced concrete tie beam, reinforced concrete column and reinforced concrete ring beam on a stable foundation with

enough strength. Every vertical part of wall corner is firmly connected, forming confined elements.

2.1 Foundation

Foundation width and height is 60 cm or more. Foundation depth is no less than 80 cm.

2.2 Sections of reinforced concrete member

- a) Tie beam width is 13 cm or 24 cm according to the width of the wall. The minimum height is 50 cm. Tie beam is reinforced with four (4) steel bars of 3/8" diameter, with stirrups of 1/4" diameter at 20 cm intervals. If the soil is mainly composed of slime and/or sand, the tie beam is needed to be reinforced.
- b) Maximum wall area framed with tie beam, column and ring beam is 12.0 m². The maximum height of the wall is 2.4 m.
- c) Column has a minimum section of 13 cm wide and 15 cm high, and four (4) steel bars of 3/8" diameter are placed with hoops of 1/4" diameter. Five (5) hoops are placed from the connection point with tie beam. First hoop is placed at 5 cm from the connection point. The other four (4) hoops above the first hoop are placed at 10 cm interval. Another five (5) hoops are placed from the point with ring beam as the same case from the connection of tie beam. At the rest space of column hoops are placed at 25 cm interval.
Additionally, two (2) stirrups are placed in joint of column and ring beam at 10 cm interval. Two (2) stirrups are also placed in joint of column and tie beam at 10 cm interval.
- d) Minimum dimension of ring beam is 13 cm wide and 20 cm high, and four (4) steel bars of 3/8" diameter are placed with stirrups of 1/4" diameter. Five (5) stirrups are placed from the connection point with column. First stirrup is placed at 5 cm from the connection point. The other four (4) stirrups beside the first stirrup are placed at 10 cm interval. Another five (5) stirrups are placed from the connection point with the other column as the same case from the connection of the other above mentioned column. At the rest space of ring beam space stirrups are placed at 25 cm interval.
- e) Minimum covering depth of concrete is 2 cm for walls with finish and 3 cm for walls without finish. In case of foundation, covering depth is 7.5 cm.
- f) Minimum length of structural wall is 1.2 m.

2.3 Maximum span

Maximum span of columns is 5.0 m in case of 24 cm wide wall. It is 3.5 m in case of 13 cm wide wall.

3. Connection of Structural Members

3.1 Anchor of column to tie beam and ring beam

Four (4) steel bars of column anchor to the foundation. The steel bars bend 90° at 7.5 cm from the bottom of foundation. The bended steel bars are prolonged 25 cm. In order to connect steel bars of column and tie beam, additional four (4) steel bars connect with each column bar that anchors to the foundation. The additional bars bend 90° at 4 cm from the bottom of tie beam. The bended steel bars are prolonged 25 cm measured from the column surface. In case of good soil, concrete without reinforcement is used and the four (4) steel bars of column anchor to the foundation.

In the same way, four (4) steel bars of column anchor to reinforced ring beam. The steel bars bend 90° at 2 cm from the top of ring beam. The bended steel bars are prolonged 25 cm measured from the column surface.

3.2 Connection of wall and column

There are two connection methods. One is that joint between wall and columns is geared and the length of the salient part of brick does not exceed 5 cm. The other is that two (2) steel bars of 1/4" diameter anchor at every four (4) layers of wall bricks at least 40 cm inside masonry and 12.5 cm inside column with vertical turning of 90° at 10 cm.

3.3 Overlapping of reinforcements

Steel bars of reinforced concrete overlap at least at 40 cm.

3.4 Wall joint mortar thickness

Thickness of joint mortar for wall is from 1.0 to 1.5 cm.

4. Drawings

4-1-A3-44



Agencia de Cooperación Internacional del Japón



PERÚ

Ministerio
de Vivienda, Construcción
y Saneamiento

**AWARENESS - RAISING CONCERNING SAFER HOUSING
FOR THE RECONSTRUCTION STUDY WITH SEISMIC
RESISTANT HOUSING IN THE REPUBLIC OF PERU**

HOUSING DRAWINGS WITH EXPOSED STRUCTURE

JICA STUDY TEAM

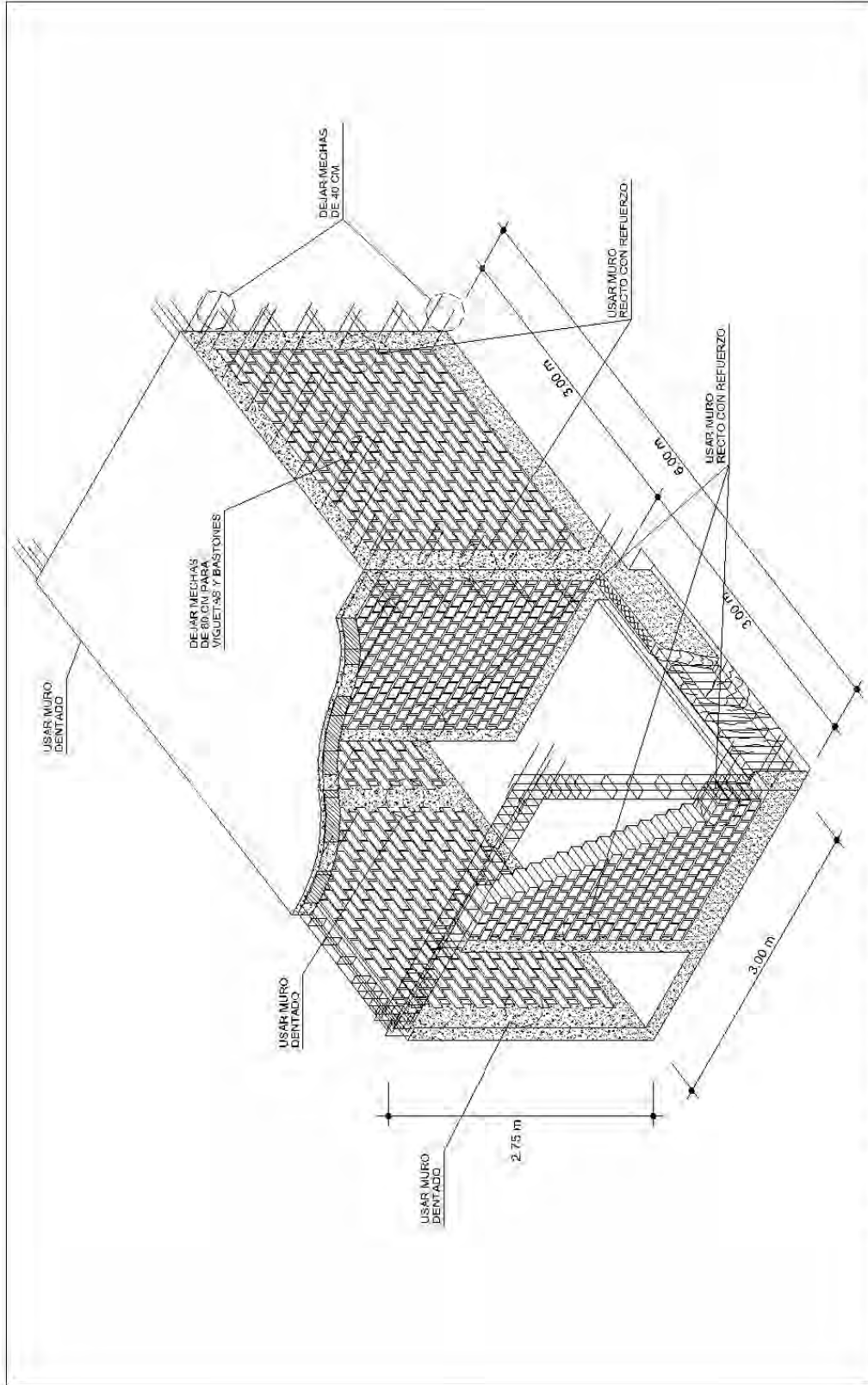
AUGUST 27th 2008 08

PILOT PROJECT N° 2.1 .1
(ICA-PERU)

INDICE DE PLANOS :

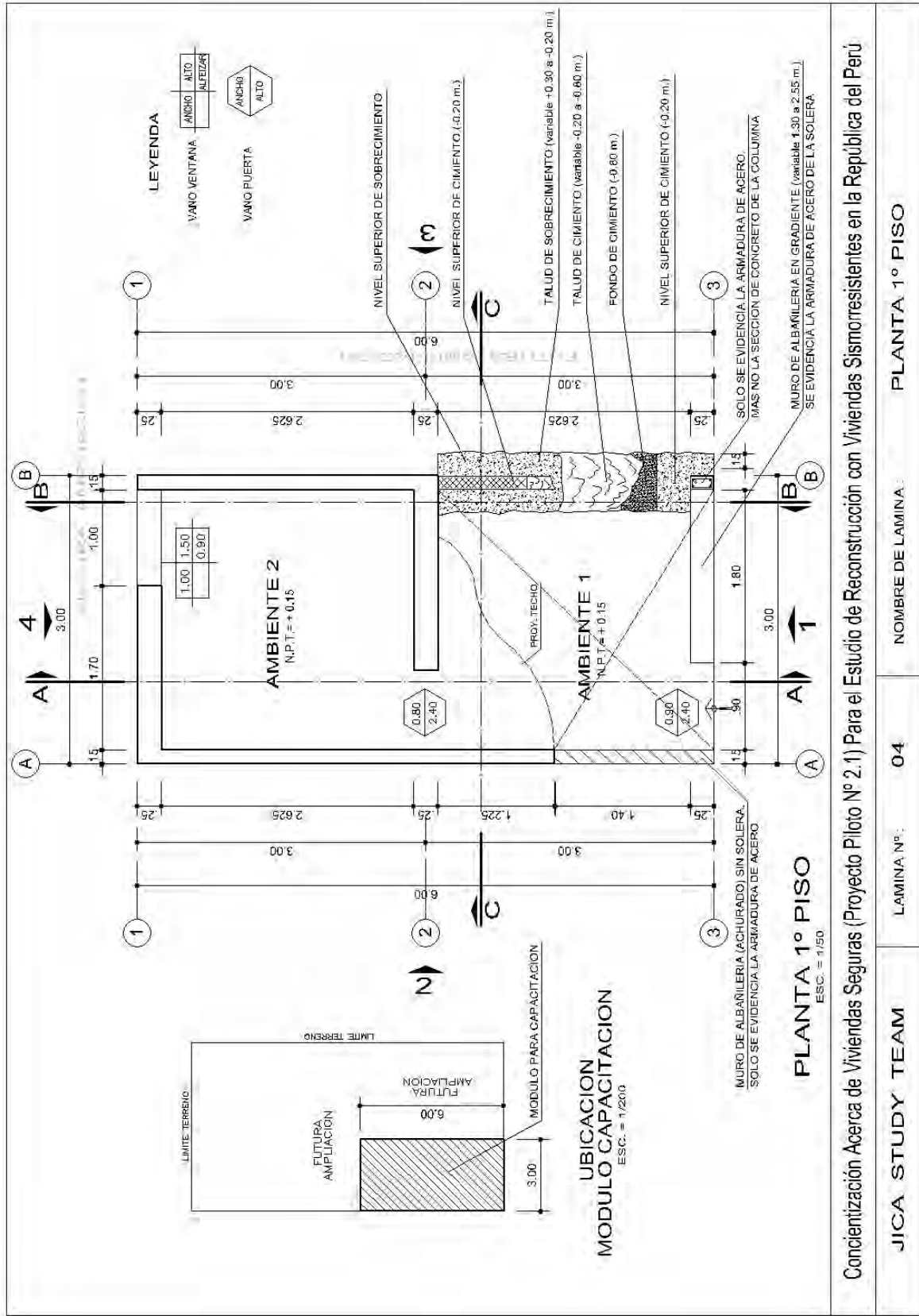
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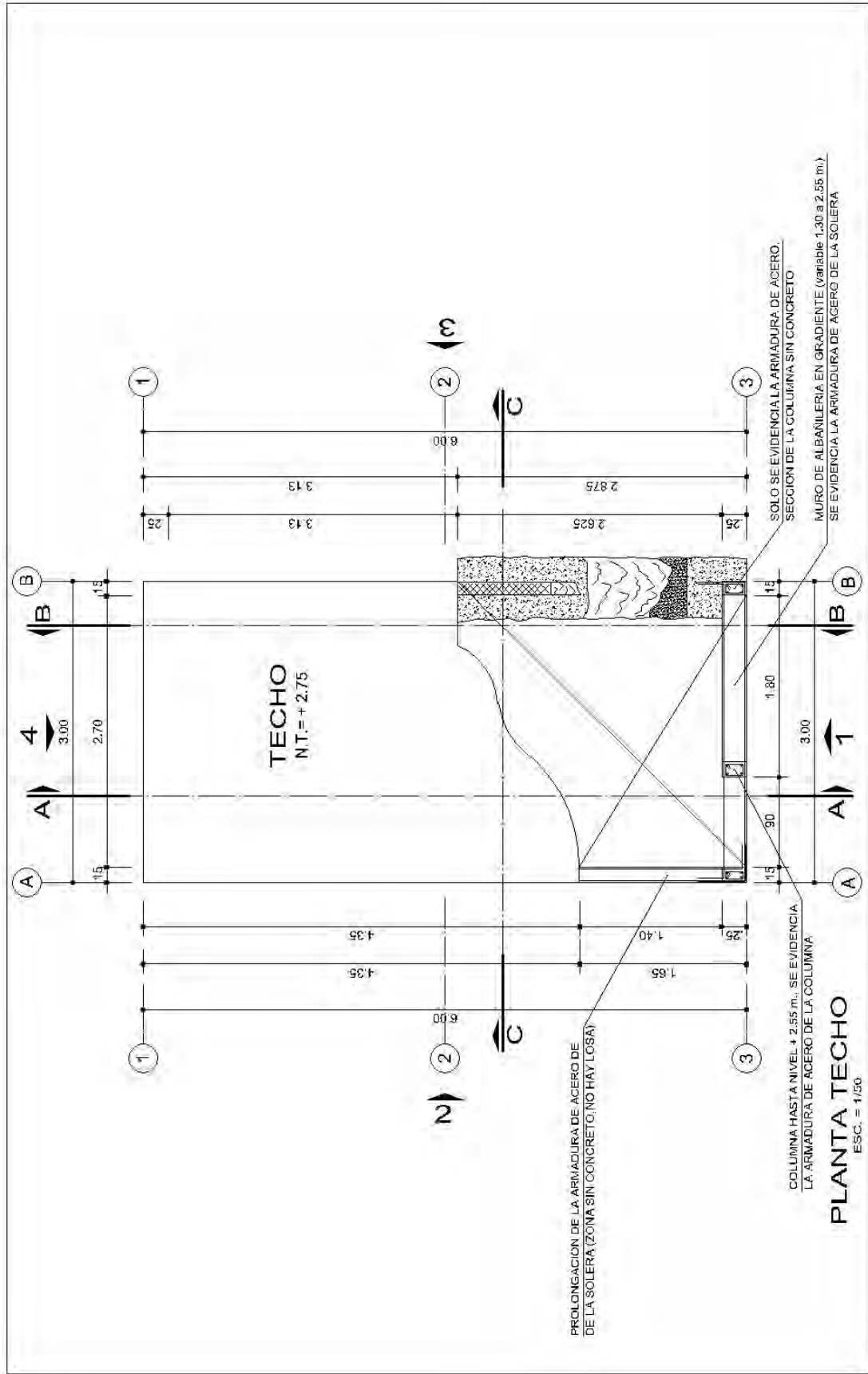
- ISOMETRIA	03
- PLANO DE PLANTA 1° PISO	04
- PLANO DE PLANTA TECHO	05
- PLANO DE ELEVACIONES	06
- PLANO DE CORTES	07
- PLANO DE CIMENTACION Y DETALLES	08
- PLANO DE DETALLES DE CIMENTACION	09
- PLANO DE ENCOFRADO TECHO, DETALLES	10
- PLANO DE DETALLES COLUMNAS Y ENCIENTROS	11
- PLANO DE DETALLES DE ALBAÑILERIA CONFINADA	12
- PLANO DE ESPECIFICACIONES TECNICAS	13



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

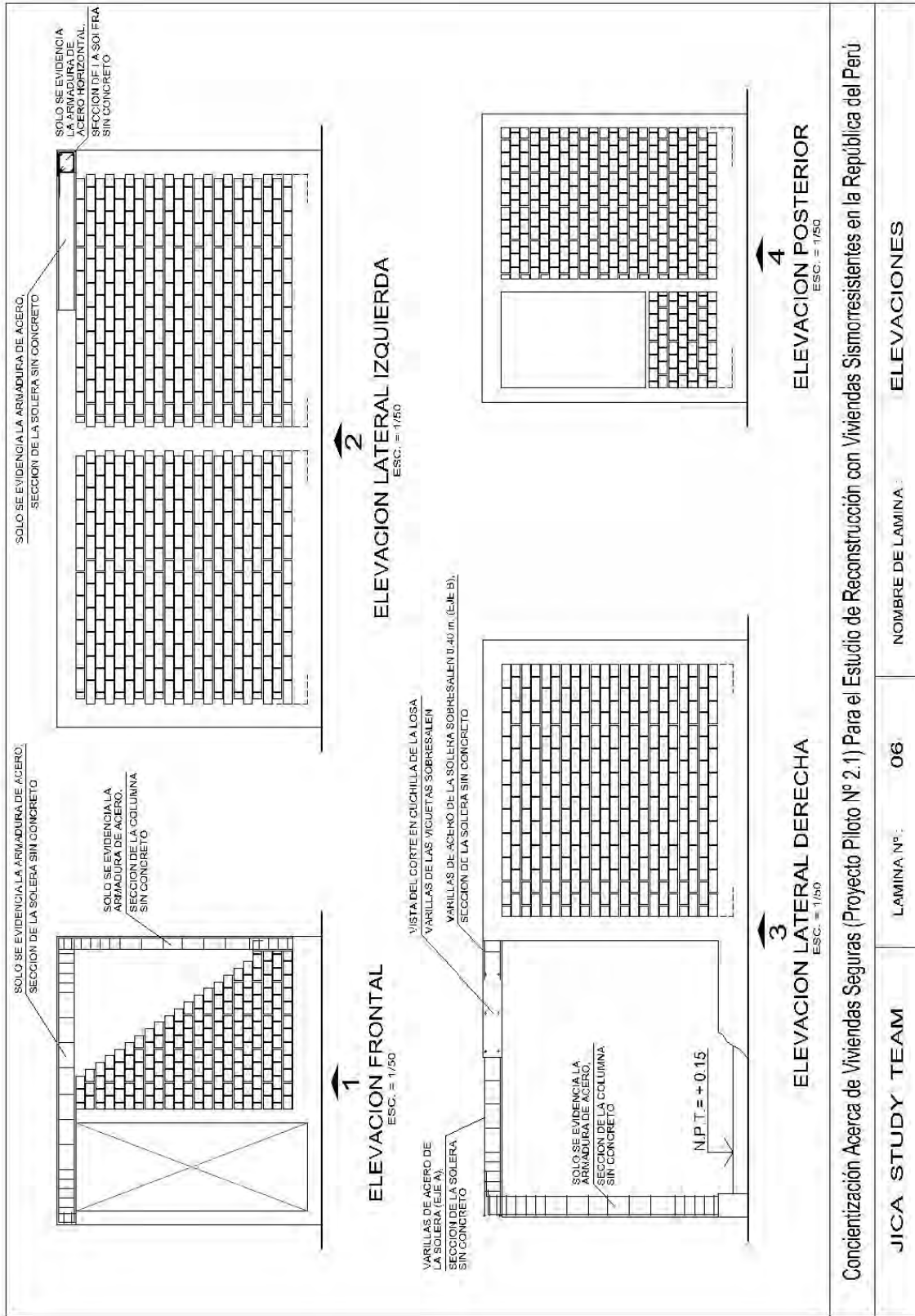
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Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

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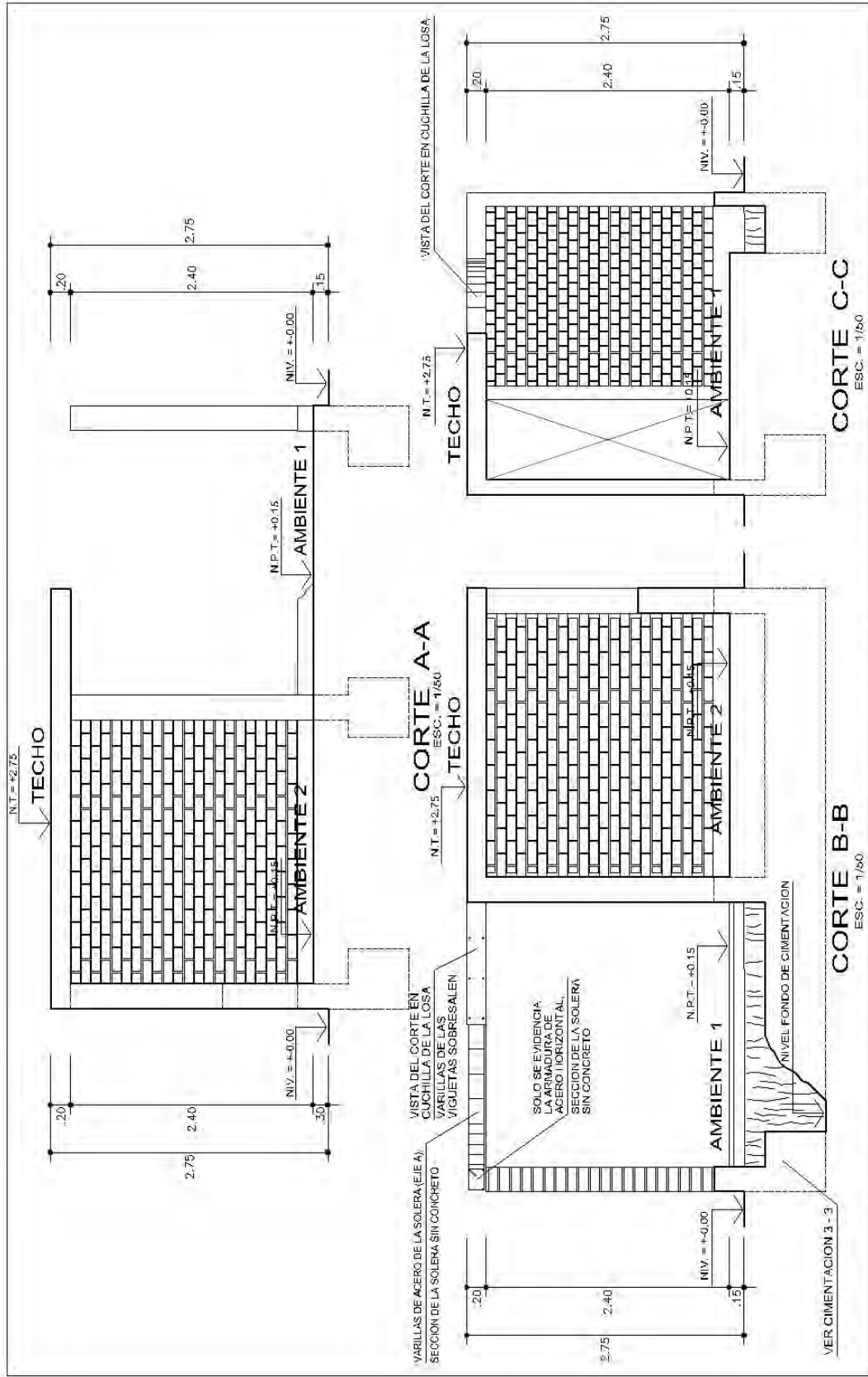


Concientización Acerca de Viviendas Seguras (Proyecto Piloto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM

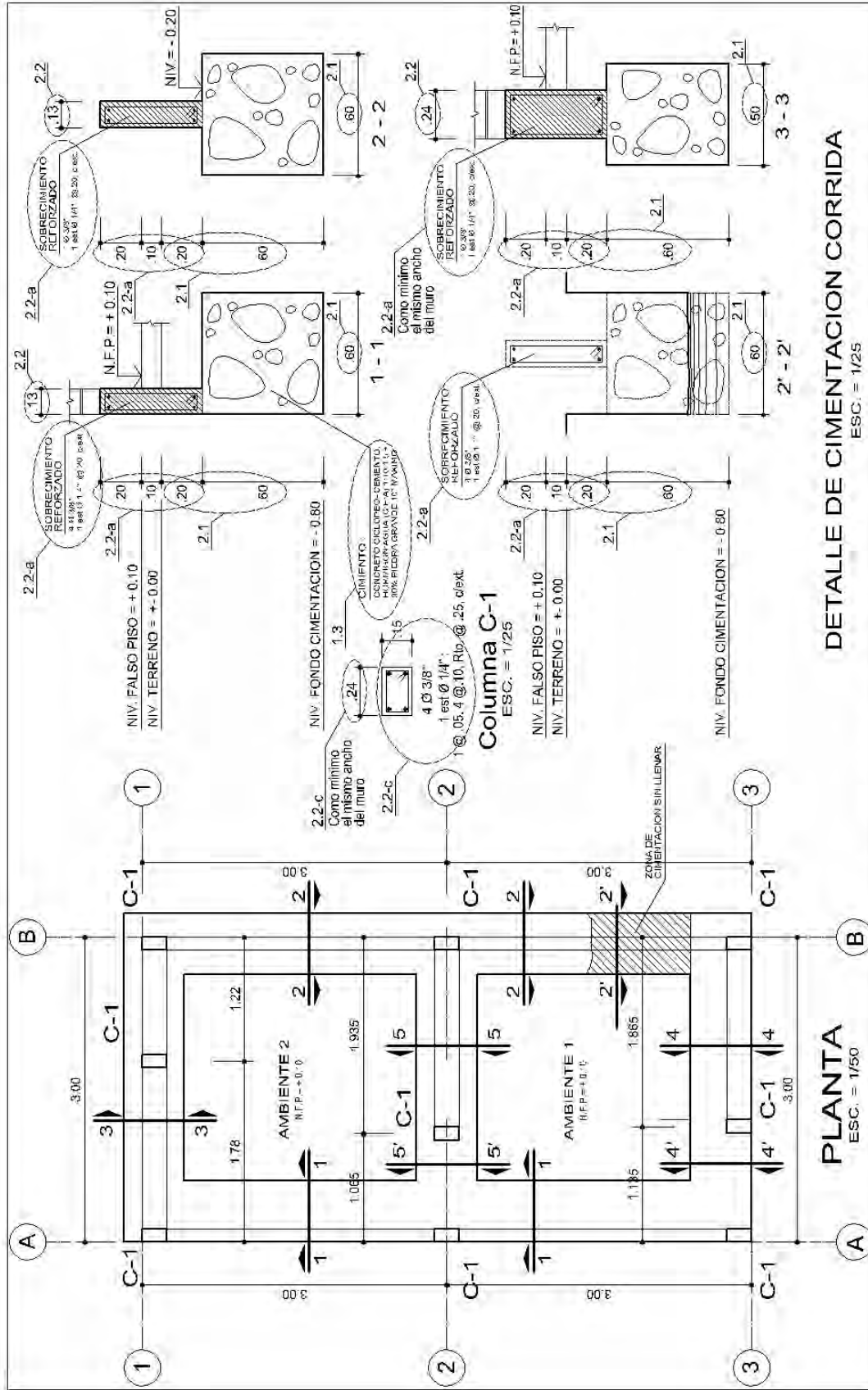
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NOMBRE DE LAMINA: ELEVACIONES



Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

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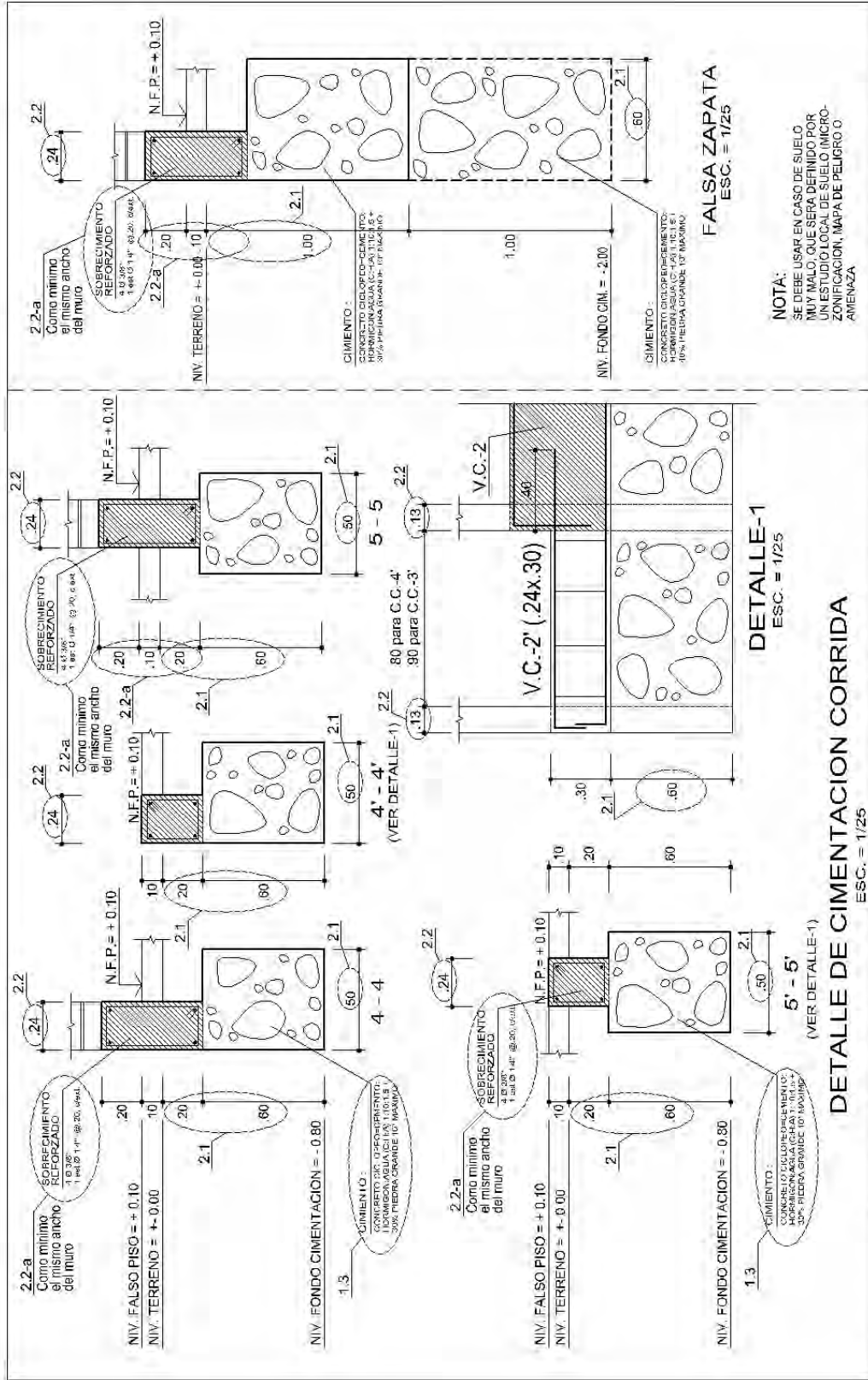


DETALLE DE CIMENTACION CORRIDA
ESC. = 1/25

PLANTA
ESC. = 1/50

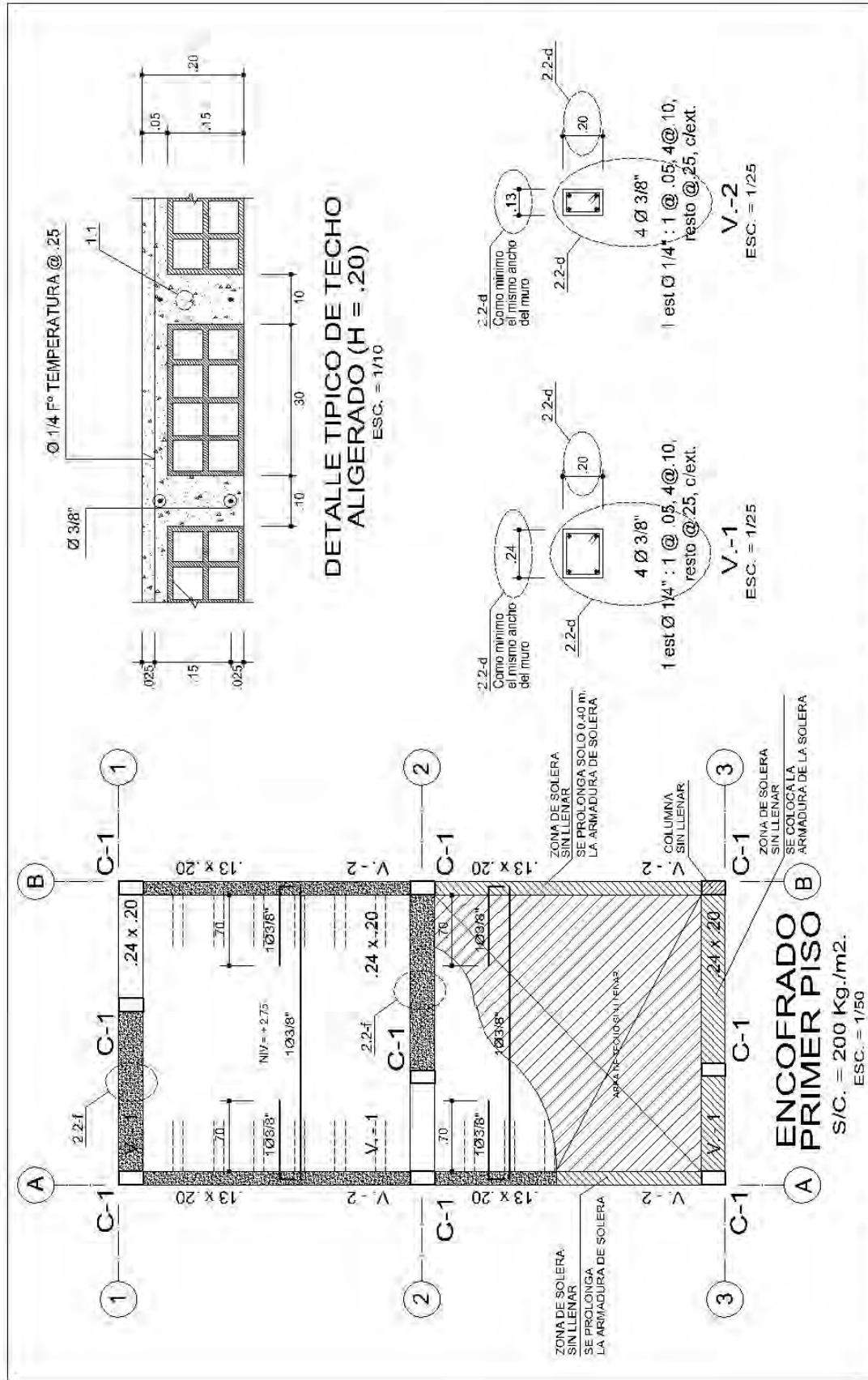
Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM LAMINA N°: 08 NOMBRE DE LAMINA: CIMENTACION, DETALLES



Concientización Acerca de Viviendas Seguras (Proyecto Ploto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

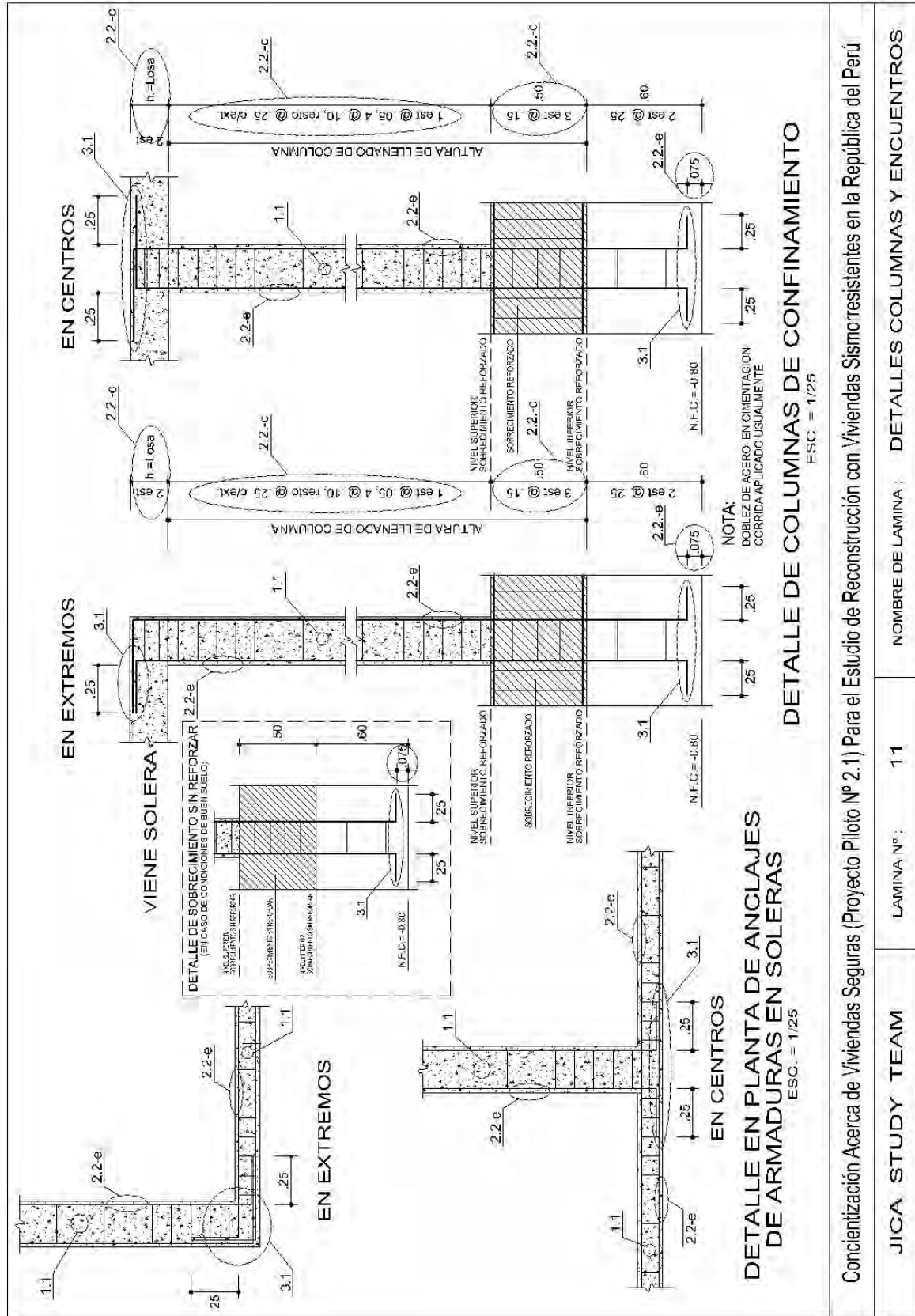
JICA STUDY TEAM	LAMINA Nº:	09	NOMBRE DE LAMINA:	DETALLES DE CIMENTACION
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Concientización Acerca de Viviendas Seguras (Proyecto Piloto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM	LAMINA Nº: 10	NOMBRE DE LAMINA: ENCOFRADO TECHO, DETALLES
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ENCOFRADO PRIMER PISO
 S/C. = 200 Kg./m².
 ESC. = 1/50



DETALLE DE COLUMNAS DE CONFINAMIENTO
ESC. = 1/25

DETALLE EN PLANTA DE ANCLAJES DE ARMADURAS EN SOLERAS
ESC. = 1/25

Concientización Acerca de Viviendas Seguras (Proyecto Piloto Nº 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM	LAMINA Nº: 11	NOMBRE DE LAMINA: DETALLES COLUMNAS Y ENCUENTROS
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	<p>DETALLE DE EMPOTRAMIENTO DE TUBERIA DE INSTALACIONES ELECTRICAS ESC. = 1/50</p> <p>ESPESOR DE JUNTA DE MORTERO PARA ALBAÑILERIA ESC. = 1/10</p>					
	<p>DETALLE DE CONEXION A RAS COLUMNA-ALBAÑILERIA OPCION-2 ESC. = 1/50</p> <p>DETALLE DE CONEXION A RAS COLUMNA-ALBAÑILERIA ESC. = 1/25</p>					
	<p>DETALLE DE CONEXION DENTADA COLUMNA-ALBAÑILERIA OPCION-1 ESC. = 1/50</p> <p>DETALLE DE CONEXION DENTADA COLUMNA-ALBAÑILERIA ESC. = 1/25</p>					
	<p>DETALLE DE CONEXION DENTADA COLUMNA-ALBAÑILERIA OPCION-2 ESC. = 1/50</p> <p>DETALLE DE CONEXION DENTADA COLUMNA-ALBAÑILERIA ESC. = 1/25</p>					
<p>Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú</p> <table border="1"> <thead> <tr> <th>JICA STUDY TEAM</th> <th>LAMINA N°:</th> <th>12</th> <th>NOMBRE DE LAMINA:</th> <th>DETALLES DE ALBAÑILERIA CONFINADA</th> </tr> </thead> </table>		JICA STUDY TEAM	LAMINA N°:	12	NOMBRE DE LAMINA:	DETALLES DE ALBAÑILERIA CONFINADA
JICA STUDY TEAM	LAMINA N°:	12	NOMBRE DE LAMINA:	DETALLES DE ALBAÑILERIA CONFINADA		

ESPECIFICACIONES TECNICAS DE LOS MATERIALES

ACERO:

Las varillas de acero utilizadas en la construcción de estructuras de albanilería, cumplirán los requisitos establecidos en los capítulos 7 y 8 de la norma E-060 para concreto armado. El acero será de calidad grado 60, con un esfuerzo en el límite de fluencia de 17-220 kg/cm².

Dimensiones de acero de la norma ASTM A-615

Diámetros nominales de barras sin rebabas:

- Ø 3/8" o 89/16"
- Ø 1/2"
- Ø 3/4" y mayores

DEBERA OBSERVARSE QUE LAS VARILLAS A EMPLEAR PRESENTEN SU SUPERFICIE LIBRE DE CORROSION, GRIETAS, SOLDADURAS U OTRO DEFECTO.

COLOCACION DEL REFUERZO:

PREPARACION Y COLOCACION:

ANTES DEL EMPLEO DE LAS VARILLAS SE LIMPIARAN CUIDADOSAMENTE PARA QUE SE ENCUENTREN LIBRES DE POLVO, BARRO, ACEITES, PINTURA Y TODA OTRA SUSTANCIA CAPAZ DE REDUCIR LA ADHERENCIA CON EL CONCRETO.

PARA SOSTENER O FIJAR LAS VARILLAS EN LOS LUGARES CORRESPONDIENTES SE EMPLEARAN CARRASAS O ANILLOS DE ALAMBRE DE ALAMBRE DE ALAMBRE DE ALAMBRE, O CARRAS, NI PARRILLAS DE ABRIGADOS.

REQUERIMIENTOS DEL REFUERZO:

SE ENTENDE POR REQUERIMIENTOS A LA DISTANCIA LIBRE COMPROMIDA ENTRE EL PUNTO MAS SUJETO DE CUALQUIER REFUERZO Y LA SUPERFICIE EXTERNA DEL CONCRETO MAS PROXIMO, EXCLUYENDO TRABAJOS U OTRO MATERIAL DE ABRIGADOS.


DIMENSIONES DE LOS REQUERIMIENTOS:

ELEMENTOS RECTANGULARES:

- SOLERAS Y COLUMNAS DE ALBANILERIA (TUBERIAS) 2.0 cm
- SOLERAS Y COLUMNAS DE ALBANILERIA (CARRASAS) 3.0 cm
- CIMENTOS CORRIDOS 7.5 cm

CUANDO SEA NECESARIO LOS REQUERIMIENTOS SE LOGRARAN MEDIANTE EL EMPLEO DE DADOS DE CONCRETO O MORTERO.

REQUERIMIENTO EN SOLERAS Y COLUMNAS:



SEPARACION ENTRE VARILLAS:

LA SEPARACION MINIMA ENTRE VARILLAS RECTAS INDIVIDUALES Y ENABLAS DE LA ARMADURA DEBEN DE UNA ZONA DE ENTALME EN GENERAL DEBERA SER COMO MINIMO 2.50 cm. Y NO MENOR QUE EL TAMAÑO MINIMO DE ABRIGADO GRIETA.

CONCRETO:

CONCRETO SIMPLE

-Ornato: 1:10:1.5 (CEMENTO : HORMIGON : AGUA) + 500 CM³ MAX.

CONCRETO ARMADO

-Substrato reforzado: 1:2:4:1 (CEMENTO : ARENA CRUELA : PIEDRA CHANADA 1/2" : AGUA)

-Columnas de confinamiento: 1:3:5:1 (CEMENTO : ARENA CRUELA : PIEDRA CHANADA 1/2" : AGUA)

-Mazas soleras, losa aligerada.

ALVALICERAS

- Los valdicos deberan estar libres de polvo, sin grasas ni aceites.

ACERO:

-Estructo fierro: 1 y 4-200 kg/cm²

LONGITUD DE MALLA:

30 DIAMETROS

MORTERO:

Mortero adhesion, trabado, interno y fluido (60-150) cemento tipo 1 y 1/2

CRITERIOS DE DISEÑO ESTRUCTURAL

A. CULOMBOS DE SISMOS UTILIZADOS

1.00 CONOCASULTI ZADOS

NORMA E-009 (sismo)

NORMA E-000 (sismo sismosésistémico)

NORMA E-060 (concreto armado)

NORMA E-070 (albanilería)

2.00 REGLAMENTO

Reglamento Nacional de Edificaciones

3. CARGAS Y DISEÑO

2.00 sobrecarga viva (leño) máxima 200 kg/cm²

3.00 peso propio de aligerado 300 kg/cm²

C. CLASIFICACIONES

CATEGORIA TIPO CIMENTO CORRIDO

a. Perforada de fibra de vidrio 0.50 kg/cm²

b. Perforada de fibra de vidrio 0.80 m. mib.

TRASLAPES Y EMPALMES

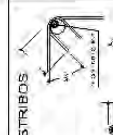
LOSAS VIGAS (cm):

Ø	30
30mm	40
3.6"	30
1.2"	30
5.6"	60
3.4"	70
1"	120

LOSAS Y SOLERAS:

NO SE REQUERIRAN EMPALMES DE REFUERZO EN PERFILES DE REFUERZO CENTRAL NO SUPERAVAN LA ALZ DE LOSA Y VISA A CADA UNO DE LA COLUMNA O NUDO.

ESTRIBOS:



Ø L R/165

Ø	14"	10cm	1.5cm
Ø	3.6"	15cm	2cm

PARAMETROS SISMICOS

PARAMETRO	FACTOR
Zona	Z = 0.1 g
Calculo	U = 1.0
Tipo de Suelo	S = 1.0
Verificación de Suelo	T ₀ = 0.2 s
Coef. de Reducción	R = 6
Coef. Sismico	C = 2.0

CUADRO DE GANCHOS STANDARD EN VARILLAS DE ACERO CORRUGADAS PARA VIGUETAS

NOTA:

EL ALICHO DE REFUERZO UTILIZADO EN FORMA LONGITUDINAL EN SOLERAS Y COLUMNAS DEBERA SER DE TIPO EN GANCHOS STANDARD EN VARILLAS CORRUGADAS EN UNO DE LOS LADOS DE LA VIGUETA.

EL CUADRO DEBEN SER 5000.

PARAMETRO	VALOR
G (cm)	3.6"
Ø	1.2"
Ø	2.5

ESPECIFICACIONES TECNICAS DE LOS MATERIALES

ACERO:

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- Ø 3/8" o 89/16"
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- Ø 3/4" y mayores

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PREPARACION Y COLOCACION:

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PARA SOSTENER O FIJAR LAS VARILLAS EN LOS LUGARES CORRESPONDIENTES SE EMPLEARAN CARRASAS O ANILLOS DE ALAMBRE DE ALAMBRE DE ALAMBRE, O CARRAS, NI PARRILLAS DE ABRIGADOS.

REQUERIMIENTOS DEL REFUERZO:

SE ENTENDE POR REQUERIMIENTOS A LA DISTANCIA LIBRE COMPROMIDA ENTRE EL PUNTO MAS SUJETO DE CUALQUIER REFUERZO Y LA SUPERFICIE EXTERNA DEL CONCRETO MAS PROXIMO, EXCLUYENDO TRABAJOS U OTRO MATERIAL DE ABRIGADOS.


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ALVALICERAS

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ACERO:

-Estructo fierro: 1 y 4-200 kg/cm²

LONGITUD DE MALLA:

30 DIAMETROS

MORTERO:

Mortero adhesion, trabado, interno y fluido (60-150) cemento tipo 1 y 1/2

TRASLAPES Y EMPALMES

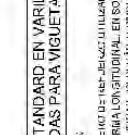
LOSAS VIGAS (cm):

Ø	30
30mm	40
3.6"	30
1.2"	30
5.6"	60
3.4"	70
1"	120

LOSAS Y SOLERAS:

NO SE REQUERIRAN EMPALMES DE REFUERZO EN PERFILES DE REFUERZO CENTRAL NO SUPERAVAN LA ALZ DE LOSA Y VISA A CADA UNO DE LA COLUMNA O NUDO.

ESTRIBOS:



Ø L R/165

Ø	14"	10cm	1.5cm
Ø	3.6"	15cm	2cm

PARAMETROS SISMICOS

PARAMETRO	FACTOR
Zona	Z = 0.1 g
Calculo	U = 1.0
Tipo de Suelo	S = 1.0
Verificación de Suelo	T ₀ = 0.2 s
Coef. de Reducción	R = 6
Coef. Sismico	C = 2.0

Concientización Acerca de Viviendas Seguras (Proyecto Piloto N° 2.1) Para el Estudio de Reconstrucción con Viviendas Sismorresistentes en la República del Perú

JICA STUDY TEAM LAMINA N°: 13 NOMBRE DE LAMINA: ESPECIFICACIONES TECNICAS

REFERENCES:

- **Manual “Construcción y Mantenimiento de Viviendas de Albañilería”
Universidad Católica del Perú 2006**
- **Manuales didácticos “Encofrado y fierreteria y albañilería”
SENCICO 2000**

Appendix 4

List of Trainees

Appendix 4 List of Trainees

Family name	First Name	Age	Sex	Marital Status	Address	District, Province-Department
Carpio Garcia	Carmen	38	F	M	Jr. Ica 824	Pueblo Nuevo, Chincha-Ica
Carrizales Rojas	Heine	22	M	S	Av. Santa Rosa 403	Pueblo Nuevo, Chincha-Ica
Ccochachi Canchari	Daniel	30	M	M	Jr. Los Martires 841, San Isidro	Pueblo Nuevo, Chincha-Ica
Chavez Sambrano	Mairy	28	F	M	Jr. Los Martires 841, San Isidro	Pueblo Nuevo, Chincha-Ica
Cordova Nuñez	Jony	34	M	S	Calle Jose Olaya 322 Santa Rosa	Pueblo Nuevo, Chincha-Ica
Cruces Híjar	Flor		F	S	Jr. San Martín 107	Pueblo Nuevo, Chincha-Ica
Delgado de Barrientos	María	42	F	M	Jr. Jorge Chavez 599-A San isidro	Pueblo Nuevo, Chincha-Ica
Fernández Luján	Lilia	35	F	M	Urb. León de Vivero Mz. I, Lote 11	Pueblo Nuevo, Chincha-Ica
García Díaz	Luis	54	M	S	UPIS Las Américas Unidas Mz 6 Lote 7	Pueblo Nuevo, Chincha-Ica
García Zeta	Wilmer	30	M	M	AA.HH. El Salvador Mz C Lote 4	Pueblo Nuevo, Chincha-Ica
Matta Yachi	Pablo	43	M	M		Pueblo Nuevo, Chincha-Ica
Pariona Salvatierra	Eusebia	45	F		AA.HH. Villa Sol Mateo Pumacahua Mz G lote 18	Pueblo Nuevo, Chincha-Ica
Quispe Cuba	Gloria	45	F	M	Olivia Razeto Mz A Lote 10	Pueblo Nuevo, Chincha-Ica
Quispe Sotelo	Eusebio	49	M	M	AA.HH. Miguel Grau Mz. P Lote 3	Pueblo Nuevo, Chincha-Ica
Rojas Florez	Jorge	24	M	M	Av. Mariscal Benavides 872	Pueblo Nuevo, Chincha-Ica
Sanchez Trelles	Miguel	24	M	S		Pueblo Nuevo, Chincha-Ica
Torres Santiago	Yanina	31	F	S	Calle Micaela Bastidas 560 Santa Rosa	Pueblo Nuevo, Chincha-Ica
Villavicencio Rivera	Nikolai	24	M		Jr. Tupac Amaru 1072 San Isidro	Pueblo Nuevo, Chincha-Ica
Yeren Parreño	Alicia	39	F	S	Av. 13 de octubre 592	Pueblo Nuevo, Chincha-Ica
Yupa Bautista	Lucía	26	F	M	Fe y Alegría Mz A Lote 21	Pueblo Nuevo, Chincha-Ica

Note 1) Sex: F;Female, M;Male

Note 2) Marital status: M; Married, S;Single

Appendix 5

Daily Training Report

Appendix 5

Daily Training Report

No.	Date	Main Topics	Observations		N° of Participants
			Lesson Number	Activities	
1	Sept. 15	Start of training for cut model house building	01	<p>Knowing the land and reading the drawings</p> <p>Cartel installation :100% Land clearing: 100% Land border tracing: 100% (Percentage shows the progress of work)</p>	12
			Opening ceremony is going to be held tomorrow (Tuesday, September 16)		
2	Sept. 16	Land tracing and soil quality test for foundation	01	<p>Knowing the land and reading the drawings</p> <p>- Excavation up to 1 m depth: 100% - Soil quality test:100% - Land tracing (Stakes and security border installation): 60 %.</p>	12
3	Sept. 17	Land tracing	01	<p>Knowing the land and reading the drawings</p> <p>- Soil quality test. Results obtained after 24 hours: 100%</p>	16
			02	<p>Clearing, leveling and tracing the land</p> <p>- Leveling: 100% - Land tracing (install trig beacons, graphic method to find a 90° angle, and foundation tracing): 100%</p>	
			Cement is used for installing trig beacons properly, but some materials were not yet delivered at this time. The Instructor was asked to provide sufficient construction materials by JICA Study Team.		
4	Sept. 18	Foundation tracing	02	<p>Clearing, leveling and tracing the land</p> <p>-Theoretical lessons related to tracing of land:100%</p>	19
			03	<p>Excavating the ditch</p> <p>-Practice on foundation tracing (install trig beacons, graphic method to obtain</p>	

				90° angle and foundation tracing): 100%	
				Instructor said that participants are still lacking security shoes.	
5	Sept. 19	Foundation excavation	03	Excavating the ditch -Theoretical lessons related to minimum requirement:100% -Excavation of ditch of 80 cm. depth and 60 cm. width: 100%	19
6	Sept. 22	Making the hoops and stirrups for beams and columns	04	Making the frameworks for columns. -Written test about activities 1, 2 and 3: 100% -Theoretical lesson about habilitation and installation of hoops for columns (Minimum Requirements): 100% -Practice on hoops habilitation for columns:100%	19
				Instructor asked about the possibility of pouring a 10 cm thick poor concrete before the foundation for soil leveling. JICA Study Team agreed with this in as much as training progress is not affected.	
7	Sept. 23	Making the hoops and stirrups for beams and columns	04	Making the frameworks for columns. -Theoretical lesson about habilitation and installation of hoops for columns (Minimum Requirements): 100% -Practice on hoops habilitation for columns: 100%	19
				Engr. CAJACHAGUA (SENCICO ICA Manager) informed JICA Study Team that SENCICO will prepare a temporary space for theoretical lessons next to the “cut model house” (include seats and a roof).	
8	Sept. 24	Hoops for columns	04	Making the frameworks for columns. -Theoretical lesson about preparation and installation of hoops for columns (Minimum Requirements): 100% -Hoops preparation for columns: 50%	19
				Course Instructor was asked to hand over the digital file CVs of the Supervisor (educative and construction), Instructor and Assistant Instructor, JICA Study Team also asked about the Instructor Manual.	

9	Sept. 25	Making the hoops and rebars for columns	04	Making the frameworks for columns. -Theoretical lesson about making and installing hoops and rebars for columns (Minimum Requirements). 100% -Making hoops for columns. 100% -Structuring rebars for columns. 50 %	19
			Today, SENCICO ICA prepared a place for theoretical lessons of the “cut model” (including 13 desks).		
10	Sept. 26	Making the hoops and steel bar habilitation for columns	04	Making the frameworks for columns. -Theoretical lesson about reinforcement steel bar processing and installing for columns (Minimum Requirements): 100%. -Column steel bar processing: 100%.	20
			SENCICO (Instructor) will deliver safety shoes next week. SENCICO ICA brought seven more desks.		
11	Sept. 29	Installation of concrete blocks on the foundation where columns are going to be placed. ADRA began Project 2.2	04	Making the frameworks for columns. -Written test referred to activity 4: 100%	19
			05	Building the foundation -Theoretical lesson referred to foundation building (Minimum Requirements): 100% -Making blocks for foundation: 100%	
			Due to the start of Project 2.2, SENCICO was told to improve and/or limit the spaces destined for construction materials storage. ADRA (Project 2.2) made the presentation on Saturday, Sept. 27 at Óvalo de la Juventud, from 8:00 p.m. to 10:00 p.m., and on Sunday, Sept. 28 at the side of the “CUT MODEL HOUSE” site from 5:00 p.m. to 7:15 p.m.		
12	Sept. 30	Column framework installation	05	Building the foundation -Theoretical lesson on foundation building (Minimum requirements): 100% -Installing the column framework: 100%	20
13	Oct. 1	Concrete pouring in foundation	05	Building the foundation -Theoretical lesson on foundation building (Minimum requirements): 100%	20

				-Pouring concrete mix in foundation: 100%	
				SENCICO delivered "INSTRUCTOR MANUAL".	
14	Oct. 2	Making the tie beam steel framework	06	Making the frameworks for reinforced tie beam. -Theoretical lesson about foundation building (Minimum requirements): 100% -Tie beam steel preparation: 40%	20
				Press release on the pilot projects by JICA STUDY TEAM, shown after this table, was released to the following networks: EDUARDO ANCHANTE (CANAL 10), CRISTINA VILLAVERDE (CANAL 21), ROSARIO ANDIA (CANAL 2), FABIOLA SANCHEZ (CANAL 25) Y ERICK MORALES (CORREO).	
15	Oct. 3	Habilitation of the steel framework of the RC tie beam	06	Making the frameworks for RC tie beam. -Theoretical lesson about foundation building (Minimum requirements):100% -RC tie beam steel preparation: 60% -Reinforcement steel preparation and installation in the RC tie beam-column connection zone: 70%	20
				SENCICO gave security gear (shoes and trousers) to course participants.	
16	Oct. 6	Habilitation of the steel framework of the RC tie beam	06	Making frameworks for RC tie beam. -Theoretical lesson about foundation building (Minimum requirements):100% -RC tie beam steel preparation: 75% -Reinforcement steel preparation and installation in the RC tie beam-column connection zone: 80%.	20
17	Oct. 7			SENCICO y ADRA did not have any activities due to a regional strike in Ica.	-
18	Oct. 8			SENCICO did not schedule any activities due to national holiday.	-

19	Oct. 9	Habilitation of the steel framework of the RC tie beam	06	Making the frameworks for RC tie beam. -Theoretical lesson about foundation building (Minimum requirements):100% -RC tie beam steel preparation: 100% -Reinforcement steel preparation and installation in the RC tie beam-column connection zone: 100%.	18
20	Oct. 10	Tracing on the foundation for RC tie beam formwork	07	Making the formwork for RC tie beam -Theoretical lesson related to RC tie beam formwork (Minimum requirements): 100% -Tracing over the foundation: 100%	19
21	Oct. 13	RC tie beam formwork	07	Prepare lumber yard and tie beam formwork -Theoretical lesson about RC tie beam formwork (Minimum Requirements): 100% -RC tie beam formwork: 50%	20
				Participants said that SENCICO has not yet given them their established allowance. SENCICO explained to the participants that although JICA has deposited the required money, Economy Ministry has yet to approve SENCICO budget for the allowance payment.	
22	Oct. 14	RC tie beam formwork	07	Making the formwork for RC tie beam -Theoretical lesson about RC tie beam formwork (Minimum Requirements): 100% -RC tie beam formwork: 100%	19
23	Oct. 15	RC tie beam concrete pouring	08	Tie beam building -Theoretical lesson about RC tie beam (Minimum Requirements): 100% -Concrete preparation and pouring (1 part cement – 2 parts sand – 4 ½” parts crushed stone - 1 part water) in tie beam: 100%	19

24	Oct. 16	Taking out RC tie beam formwork	08	Tie beam building -Taking out RC tie beam formwork	20
			09	Laying the first row of bricks -Theoretical lesson about laying first row of bricks (minimum requirements): 100% -Laying first row of bricks to build a wall: 50%.	
			A questionnaire and a partial test about knowledge comprehension given to participants to answer (total duration: 30 min.) by JICA Study Team.		
25	Oct. 17	Building the walls	09	Laying the first row of bricks -Laying first row of bricks: 100%	19
			10	Building the wall -Theoretical lesson about wall building (Minimum Requirements): 100% - Wall building practice: 50%.	
26	Oct. 20	Building the walls	10	Building the walls -Theoretical lesson about construction of wall (Minimum Requirements):100% -Wall building practice: 80%	18
27	Oct. 21	Building the walls	10	Building the walls -Wall Building practice:100%	18
28	Oct. 22	Building the walls	10	Building the walls -Theoretical lesson about wall building: 100% -Building of walls: 10%	18
29	Oct. 23	Building the walls	10	Building the walls -Theoretical lesson about wall construction (Minimum Requirements): 100% -Building of walls: 30%	19

30	Oct. 24	Building the walls	10	Building the wall -Theoretical lesson on wall building (Minimum Requirements): 100% -Building of walls: 60%	19
31	Oct. 25		10	Building the wall -Theoretical lesson on wall building (Minimum Requirements): 100% -Building of walls: 75%	19
32	Oct. 28	Building the walls	10	Building the wall -Theoretical lesson on wall building (Minimum Requirements).100% -Building of walls: 90%	19
			11	column formwork and pouring concrete mix -Theoretical lesson on column formwork (Minimum Requirements): 100% - Column formwork: 15%	
33	Oct. 29	Building the walls	10	Building the wall -Theoretical lesson on wall building (Minimum Requirements).100% -Building of walls: 95%	19
34	Oct. 30	Building the walls	10	Building the wall -Building of walls: 100%	19
			11	Column formwork and concrete pouring -Theoretical lesson on column formwork (Minimum Requirements).100% - Column formwork: 20%	
35	Oct. 31	Column formwork	11	Column formwork and concrete pouring -Theoretical lesson on column formwork (Minimum Requirements): 100% -Land clearing: 100% - Column formwork. 80%	19

36	Nov. 3	Column formwork and mix pouring	11	Column formwork and concrete pouring -Theoretical lesson on column formwork and pouring concrete mix (Minimum Requirements): 100% - Column formwork: 100% -Mix pouring. 100%	19
37	Nov. 4	Column formwork and mix pouring	11	Column formwork and concrete pouring -Remove column formwork: 100% -Moist curing columns: 30%	19
38	Nov. 5	Concrete pouring in floor	11	Column formwork and pouring concrete mix -Moist curing columns: 60% -Concrete pouring in floor (10 cm): 100%	19
39	Nov. 6	Ring beam framework installation	11	Column formwork and concrete pouring -Moist curing columns: 80%	19
			12	Wood preparation and ring beam formwork -None	
			13	Ring beam framework making -Theoretical lesson on ring beam framework making (Minimum requirements): 100% -Stirrups habilitation for ring beam: 30%	
40	Nov. 7	Slab formwork installation	11	Column formwork and concrete pouring -Moist curing columns: 100%	18
			12	Wood preparation and ring beam formwork -Theoretical lesson on wood preparation and ring beam formwork (Minimum requirements): 100% -Habilitating the ring beam formwork:	

				40%	
			13	<p>Ring beam framework making</p> <p>-Theoretical lesson on ring beam framework making (Minimum requirements): 100%</p> <p>-Installing the ring beam framework: 30%</p>	
			14	<p>Slab formwork</p> <p>-Theoretical lesson on slab formwork (Minimum requirements). 100%</p> <p>-Slab formwork: 40%</p>	
41	Nov. 10	Ring beam framework installation	12	<p>Wood preparation and ring beam formwork</p> <p>-Theoretical lesson on wood preparation and ring beam formwork (Minimum requirements): 100%</p> <p>-Habilitating the ring beam formwork: 50%</p>	19
			13	<p>Ring beam framework making</p> <p>-Theoretical lesson on ring beam framework making (Minimum requirements): 100%</p> <p>-Installing the ring beam framework: 60%</p>	
			14	<p>Slab formwork</p> <p>-Theoretical lesson on slab formwork (Minimum requirements). 100%</p> <p>-Slab formwork: 60%</p>	
42	Nov. 11	Ring beam framework installation and slab formwork installation	12	<p>Wood preparation and ring beam formwork</p> <p>-Habilitating the ring beam formwork: 100%</p>	20
			13	<p>Ring beam framework making</p> <p>-Installing the ring beam framework: 100%</p>	

			14	Slab formwork -Slab formwork: 100%	
			15	Light slab framework making -Theoretical lesson on light slab frame making (Minimum Requirements): 100% -Light slab framework making: 100%	
43	Nov. 12	Light slab building	16	Light slab building -Theoretical lesson on light slab building (Minimum requirements). 100% -Light slab building: 100%	20
44	Nov. 13	Moist curing light slab	16	Light slab building -Moist curing light slabs: 100%	20
	Nov. 14			Closing Ceremony	

25 September 2008

Press Release on JICA Housing Reconstruction Pilot Projects

Under the Peru-Japan cooperation, JICA Study Team of Housing Reconstruction of Japan International Cooperation Agency (JICA), in cooperation with MVCS of the Government of Peru, has started implementing three Housing Reconstruction Pilot Projects in three municipalities of Ica region, namely La Tinguina, Pueblo Nuevo and Independencia. These Pilot Projects are designed to evaluate, in terms of effectiveness and possibility of implementation, the Full Phase of the housing reconstruction projects. These projects aim to assist the people to facilitate the reconstruction of the houses they lost as a result of the strong earthquake of August 15, 2007.

Pilot Project No.1

Project to accelerate dissemination of a Safer House against Earthquake

Activities: (1) Prototype drawings of seismic-resistant house

(2) Manual of construction method of seismic-resistant house

(3) Manual of building permits of safer houses

Pilot Project No.2

Project to accelerate Dissemination of Construction Technologies and Knowledge of a Safer House against Earthquake

Activities: (1) Introduction of minimum requirements of safer house.

(2) Illustration of construction process

(3) A VCR for seismic behavior in shaking table

(4) Brief drama to promote safe house

(5) One day training for affected people

(6) Information dissemination on reinforced adobe model house

(7) Model house construction at site

Pilot Project No.3

Project to facilitate access to Housing Reconstruction Subsidy (BONO 6000 and Techo Propio)

Activities: (1) Dissemination of financial mechanisms of the government funded program

(2) One-stop Kiosk for housing reconstruction

Timing and Venues of Projects:

PP1: Second week of Oct 2008 (La Tinguina, Pueblo Nuevo, Independencia)

PP2: Sept. 27 to Nov. 9 (Centro de Capacitacion, Chincha)

PP3: From Sept. 19 to Oct. 6, Pueblo Nuevo

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