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RECOVERY OF THE ARGENTINEAN INDUSTRIAL SECTOR

Sub-Project: Cooperativa de Trabajadores Unidos - Tucuman

"Production recovery program"

UNIDO Project: UE/ARG/04/129

Argentina

Work Contract: Strawberry Packing Plant Rehabilitation

**Final Report**



**INCOFOR**

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## **PROJECT BACKGROUND**

This document lies within the framework of the production recovery program for "Cooperativa de Trabajadores Unidos" of Campo Herrera (CTU) coordinated and managed by the United Nations Industrial Development Organization (UNIDO) with funds supplied by the Italian Cooperation Agency. In sum, the object of the program is oriented towards supporting the CTU in improving its employment conditions and increasing its competitiveness so that its products may compete in the global arena.

## **OBJECT OF THE CONTRACT**

The object of this contract is to ensure that "Cooperativa de Trabajadores Unidos" (CTU) may be in compliance with all the necessary requirements enabling it to put out world-class produce in its IQF fruit processing plant and main operations, having the equipment and facilities needed to become certified according to EurepGAP.

Therefore, the object of this document is to contract the construction, completion, and handover of the building for the **Project: Strawberry Packing Plant Rehabilitation**, whose features are included in the enclosed Descriptive Report, Drawings, Schedules, Technical Specifications, and related documents.

Once the plant is completed, CTU should be fully prepared to be subject to and pass the relevant audits and certify its processes to international EurepGap and Good Manufacturing Practices (GMP).

The processing plant must meet the requirements established under the GMP standard, and therefore, the object of the project is to adapt the plant and build storehouses in order to meet the requirements of the work processes CTU needs to implement for standard compliance. Once all the works are completed at the plant, CTU will be able to take its products to a higher value-added market and exhibit international competitiveness.

## **CURRENT STATUS OF THE WORK**

### **1- SOIL MOVEMENT**

**1-1- Excavation and removal of organic soil in side spaces of construction site:** The excavation work shall be performed until removal of 0.25 m of organic soil, which shall be taken away and disposed of as specified by Site Inspection.

Obs: Completed 100%

**1.2 - Excavation of foundations:** The excavation of foundations shall be taken to a depth as specified on Foundations Drawing (approx. 1.00 m). Notwithstanding this, in each case, the Site Inspection shall check the base of trenches (which shall be perfectly levelled out) and shall at its own discretion proceed to issue a permit allowing the continuity of the works.

Obs: Completed 100%

**1-3- Backfilling and compacting with fine rough gravel:** Once the masonry work is completed including insulation, backfilling shall be performed in interior and pavements with layers of fine rough gravel, duly compacted and levelled, up to a height suitable for pouring the 0.10 m base slab.

Obs: Completed 100%

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#### **1-4 –Preliminary work on space L1:**

**1-4a –Excavation and removal of organic soil:** The excavation work shall be performed until removal of 0.20 m of the soil found between the cement tiles, which shall be taken away and disposed of as specified by Site Inspection

Obs: Completed 100%

**1-4b –Backfilling and compacting with fine rough gravel:** Backfilling shall be performed in interior with layers of fine rough gravel, duly compacted and levelled, up to a height suitable for pouring the 0.10 m base slab.

Obs: Completed 100%

#### **2- DEMOLITIONS**

**2.1- Demolition of beams and columns:** The lower tie beams shall be demolished as marked on demolition drawing, as well as the columns indicated on that plan.

Obs: Completed 100%

**2.2- Demolition of wall finishes:** Wall finishes at spaces L7 – L9 and L19 shall be demolished and removed.

Obs: Completed 100%

**2.3- Demolition of masonry:** Masonry shall be demolished and removed as indicated on drawings.

Obs: Completed 100%

**2.4- Demolition of sinks and disconnection of water supply and sewage lines in the sector**

Obs: Completed 100%

#### **3- FOUNDATIONS:**

##### **3.1- Cyclopean Concrete Foundations:**

Foundations shall be laid under masonry. In all cases the location and dimensions of foundations are indicated on the structural drawings.

Obs: Completed 100%

##### **3.2- Concrete Footing:**

Concrete footing shall be poured on those sectors having tie-columns. In all cases its location and dimensions are indicated on the structural drawings. Construction details enclosed.

Obs: Completed 100%

#### **4- INSULATING LAYER**

##### **4.1- Horizontal Insulating Layer with Bitumen Membrane:**

Installed in all new masonry work.

Obs: Completed 100%

##### **4.2- Vertical:**

Installed in all new masonry work.

##### **- Installation:**

Installed with 1:3 medium sand-cement mortar and waterproof at 10%. Prior to setting, it shall be sprinkled with pure cement and then smoothed with a pointing trowel to avoid porosities. Subsequently, two layers of bitumen paint shall be applied, followed by a heat-weld bitumen membrane, which shall be duly protected to avoid dents and cracks. In case of damage, it shall be re-installed in full lengths.

In all cases the required thickness is 2 cm. The insulating layer shall be installed in one single operation on each sector or at the Inspection's discretion.

#### **5- BASE SLABS**

**5.1- On ground of 0.10 m:** Once backfilling and compacting operations are approved, as

indicated in 01.3 and 01.4, base slabs with a minimum thickness of 0.10 m and using 150 kg/m<sup>3</sup> of cement shall be constructed on all spaces, as indicated on Schedule of Spaces. Slabs shall have a firm even surface with no hollows, and a welded-wire mesh throughout. Expansion joints shall be installed as specified by Site Inspection, and the slab finish shall be suitable for application of bitumen membrane or granite floor as indicated on Schedule of Spaces.

- **General Facts:** In all cases the base slab shall be screed with a screed board. Hollows shall be avoided and the surface shall be firm with no loose material.

The correct level required for each case shall be considered, as specified in the documents. Note: the dimensions indicated on drawings relate to finished work.

Obs: Completed 100%

**5.2- Cement Coating:** Laid on sites as indicated on Schedule of Spaces.

## 6- REINFORCED CONCRETE

- **General Facts:** An earthquake-resistant reinforced concrete structure shall be constructed having upper and lower tie beams, confined with tie columns, as shown on enclosed drawings and schedules, and comprising the following elements:

### 6.1- RC TIE-BEAMS

#### 6.1.a- Lower tie beams:

Constructed underground on the foundations as indicated on foundations drawing.

#### 6.1.b- Upper tie beams:

Upper beams shall be constructed on all new walls, whether or not specified on upper tie beams drawing.

Obs: Completed 100%

Height is modified in 0.20 m from his original location.

Length is modified in 0.20m

### 6.2- RC TIE COLUMNS:

Of variable height, the construction details are specified on structural drawings.

All upper and lower tie beams shall be braced to tie columns for the correct distribution of seismic forces, whether or not specified on structural drawings.

- **Masonry bracing:** Interior and exterior masonry shall be braced to the reinforced concrete columns by means of  $\varnothing$  6 iron bars embedded in said columns which shall be spaced every 0.50 m. The bars shall have 0.40 m of useful length, and the joint ends holding them shall be made of 1:3 sand-cement.

- **Lintels:** In accordance with windows and doors, 3  $\varnothing$  6 iron bars with  $\varnothing$  4.2 mm abutments spaced every 20 cm shall be installed on the first joint above the opening. The iron bars shall be longer than the opening having a 0.40 m of useful length, and the joint ends holding them shall be made of 1:3 sand-cement.

- **Quality:** The quality of the reinforced concrete components to be prepared shall, in all cases, comply with the following specifications – AND-20 steel and H 17-type concrete.

Obs: Completed 100%

**6.3 –RC COLUMNS (C1):** With regard to the RC columns specified on structural drawings, RC columns shall be linked to the existing iron columns, having the height required for the correct installation of the VM1 metal beam. The reinforcement to be used shall be the same as that of the existing iron structure.

- **Quality:** The quality of the reinforced concrete components to be prepared shall, in all cases, comply with the following specifications – AND-20 steel and H 17-type concrete.

Obs: Completed 100%

## 7- MASONRY

**7.a- Exterior Masonry:** The exterior masonry shall consist of plain bricks 0.20 m thick, which shall be supplied on site by CTU in a proper and timely manner.

Obs: Completed 100%

**7.b- Interior Masonry:** The interior masonry shall consist of plain bricks of a size as specified on civil works drawings, which shall be supplied on site by CTU in a proper and timely manner.

Obs: Completed 100%

**7.c- Ceiling seals:** Both ceiling seals and infill areas above air spaces shall be made of plain brick, with 0.15 m brick bonds.

Obs: Completed 100%

**-General Facts:** The masonry shall be carefully laid out and plumb, taking into account the various thicknesses of plastering.

The brick rows shall be perfectly horizontal and bonded throughout the masonry work.

Joints shall be 1.5 cm thick and the mix shall fully cover all the spaces.

On perimeter walls, the masonry shall be built plumb on the exterior face, and in the case of partitions the walls shall be plumb on the corridors.

The joints between masonry and RC elements shall in all cases be made of a 1:3 reinforced mixture.

All masonry work shall be bonded to RC elements as specified on structural drawings.

## 8- PLASTERING

### 8.1- Coarse exterior plastering:

#### 8.1.a- Cement floating coat with waterproofer:

A cement floating coat (1:3 medium sand-cement with waterproofer of Sika type or similar) shall be applied on plain brick wall. The coating shall cover the whole exterior surface, including reinforced concrete elements.

Obs: Completed 100%

#### 8.1.b- Coarse lime plaster:

Once the cement floating coat is completely set, the coarse lime plaster shall be applied, screed, float-finished, and covered with a fine-mesh net, with a minimum thickness of 15 mm. The plastered surface shall be plumb, with no hollows, and free of waves. Imperfections shall not be allowed on any account, so that the Inspection may request the demolition of entire sections.

Obs: Completed 100%

### 8.2- Interior coarse plaster:

Coarse plaster with cement and fine lime plastering shall be applied on interior walls, as specified on Schedule of Spaces.

#### 8.2.a- Cement plastering:

Cement plastering (1:3 sand-cement with waterproofer of Sika type or similar at 10%) shall be applied on the entire interior masonry surface.

Obs: Completed 100%

#### 8.2.b- Coarse plaster:

Coarse lime plaster shall be applied directly on the cement plastering of all interior walls. The plaster shall be screed and float-finished, with a maximum thickness of 15 mm.

Obs: Completed 100%

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**8.3 - Fine plaster with prepared material:**

Fine lime plaster covered with a fine-mesh net, with a maximum thickness of 5 mm, shall be applied on all interior walls free of wall finishes.

Obs: Completed 100%

**9- FLOORS**

Floors shall be laid on all spaces as indicated on enclosed specifications and Schedule of Spaces.

**9.1. Blangino Granite Tile Floor:** BLANGINO tiles, Sahara colour, code 217, 0.30 x 0.30 m, 25 mm thick; having a facial surface with a minimum thickness of 10 mm. Tiles shall have a factory semi-polished finish. A proper adhesive, as recommended by tile manufacturer, shall be used for installation.

- **Slopes:** During construction, all floors shall be provided with adequate slope to ensure correct water drainage. Note: levels shown on drawings refer to finished work.

- **Quality:** floor tiles shall be IRAM compliant.

Obs: Completed 100%

The color is replaced Sahara for beige.

One adds floor in zone of access

**9.2- Cement tiles:** Non-slip squared pattern, 20 x 20 cm, 64 beige or white units installed in the shower area.

- **General Facts.**

Obs: Completed 100%

**9.3- Transition Floorings and Doorsills:** Galala Egipcio-type marble units, 20 mm thick, shall be applied as indicated on Schedules of Spaces. The front and exposed surfaces shall have a polished finish.

**9.3.a- Transition Floorings:** The length of transition floorings shall depend on the width of the opening containing them, and the width shall equal the thickness of that wall.

Obs: Completed 100%

**9.3.b1- Doorsills:** The length of doorsills shall depend on the width of the opening containing them, and the width shall be 1 cm more than the thickness of the wall, like an exterior overhanging section.

Obs: Completed 100%

**9.3.b2- 1 1/2" x 3/16" L-shaped Doorsills:** The length of doorsills shall depend on the width of the opening containing them, located in spaces L4 and L3.

Obs: Completed 100%

**10- WALL BASES**

**10.1- BLANGINO Granite Wall bases 10 x 30 cm:** All interior spaces shall be fitted with wall bases with the same features as the units used in floors. In all cases, wall base height shall be 0.10 m above finished floor level.

Obs: Completed 100%

**10.2- Sanitary Granite Wall base:** "Sanitary" type units shall be used in sanitary areas as indicated on Schedule of Spaces.

- **General Facts:** Installation shall require the use of correct adhesives and grouts, as recommended by tile manufacturer.

Obs: Completed 100%

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**10.2- Cement Wall Base:** A cement wall base shall be installed throughout the exterior perimeter with 1:5 medium sand-cement mortar. It shall be poured directly on the masonry surface and project 0.02 m beyond the outside plumb of the wall. The wall base shall be constructed on the perimeter pavement and rise 0.30 m above the horizontal insulating layer level.

In the case of space L4, the wall base will be plumb with the interior plastering.

**- General Facts.**

- **Plumb:** In all cases, wall bases shall be perfectly plumb and aligned. Wall bases shall project evenly beyond the plumb of the finished wall.

- **Joints:** Joints between pieces shall be properly grouted together, as well as those between floor and wall base.

- **Quality:** wall bases shall be IRAM compliant.

Obs: Completed 100%

## 11- WALL FINISHES

**11.1- Glazed Tiles:** Wall finishes of polished smooth glazed tiles, 0.15 x 0.15 m, of same colour as existing pieces shall be installed on the existing plaster with KLAUKOL FLEX-type adhesive suitable for application on smooth surfaces, at the spaces as indicated on Schedule of Spaces. In the case of space L16, the tiles shall be applied up to the existing height, and in the case of washbasins, as indicated on enclosed drawing.

Obs: Completed 100%

**11.2- Glazed Ceramic Tiles on adhesive:** Wall finishes of polished smooth beige ceramic tiles, 0.15 x 0.15 m, shall be installed on coarse plaster using adhesive, at the spaces indicated on Schedule of Spaces. Wall finishes shall be applied throughout the space perimeter, above the wall base and up to the ceiling, as indicated on Schedule of Spaces.

Obs: Completed 100%

## 12- CEILINGS

Ceilings of different kinds shall be constructed, as indicated on drawings, schedule of spaces, and specifications below.

Plaster panels shall be installed in all interior spaces. Panels shall be of the fixed type, as shown on ceilings drawing.

**12.1-DURLOCK White Fixed Panels:** Panels at edge areas shall be fixed to the structure with the system appurtenances and elements. Joints shall be grouted with putty and system appurtenances, and be of dimensions as specified on drawings.

Obs: Completed 100%

**12.2- DURLOCK Damp-proof Green Fixed Panels:** Ceiling panels treated with damp-proof materials shall be installed at the spaces indicated on drawings and schedule of spaces. As in the cases above, the installation shall be performed with the system appurtenances and elements.

Obs: Completed 100%

- **Frame Installation:** The frame of fixed panels shall be made of hot-dipping galvanised steel sheet bars and shall be firmly mounted with the system appurtenances and elements. In the case of dismountable panels, the frame shall be made of exposed pre-painted aluminium inverted T-bars.

## 13- ROOFING

Two types of roofing shall be utilised. Metal roofing on iron beams and purlins shall be mounted on low walls in the services areas located in the east and west sides, and on the middle main

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area, as indicated on structural drawings.

**13.1- Metal sheets on iron frame + Glass wool insulation - Extension of side spaces. The insulation will be of glass wool with craft paper on 10 x 10 cm NITROPLAST mesh:** The whole roofing shall be installed in the sector as indicated on structural drawings. It shall include one Ø 64 wind turbine ventilator. The entire structure shall have a finish of two aluminium-colour rust-resistant paint coats.

Obs: Completed 100%

**13.2 Replacement of sheet roof + Glass wool insulation with white polyester film and 6 purlins, 15 cm x 10 cm, 3 x Ø 10 + Ø 8 – Existing central space:** The existing roof as shown on drawings shall be removed by taking away the sheets in an orderly way to avoid any damage. Sheets shall be stored as indicated by Site Inspection. Repair work shall be conducted on the existing metal frame, including painting and replacement of any items damaged or lost over the years.

Subsequently, three purlins shall be added of a similar type as the existing ones, as indicated on structural drawings. Additionally, two Ø 10 truss elements in the shape of St Andrew's Cross shall be fitted, as indicated on drawings. The insulation will be of glass wool with white polyester film, on a 10 x 10 cm NITROPLAST mesh. It shall include one Ø 64 wind turbine ventilator. The entire structure shall have a finish of two aluminium-colour rust-resistant paint coats.

Obs: Completed 100%

**13.3 - Metal sheets on iron frame + Glass wool insulation - The insulation will be of glass wool with white polyester film - Extension of Central Space:** The whole roofing shall be installed in the sector as indicated on structural drawings. The insulation will be of glass wool with white polyester film, on a 10 x 10 cm NITROPLAST mesh. It shall include one Ø 64 wind turbine ventilator.

Additionally, a No 24 galvanised sheet slope shall be fitted like a 1 m border all along the free perimeter, conveniently mounted on a metal frame. The entire structure shall have a finish of two aluminium-colour rust-resistant paint coats.

**- Metal Roofing. General Facts:**

- **Metal Sheets:** The roofing itself shall be made of BWG No 24 galvanised corrugated sheets, which shall be braced to the metal frame by means of galvanised threaded hooks with PVC caps.

- **Frame:** The frame shall be made of iron beams and purlins, of dimensions, separations, etc. as indicated on enclosed drawings. The roofing frame shall be mounted on the upper reinforced concrete beams, which shall be constructed according to the roofing slope, as indicated on drawing of details, and shall be securely braced to those beams through the Ø 6 iron bars embedded in the concrete for that purpose. No boring into concrete shall be allowed on any account when placing such anchors.

Anchors between beams and purlins shall be provided with anchor bolts and nuts inserted in oval holes so as to avoid expansion.

- **Roofing pieces and appurtenances:** In the case of ridges and seals, a series of finishing pieces shall be installed made of BWG No 24 galvanised corrugated sheet, as indicated on drawings of details.

- **Gutters:** Gutters shall be made of BWG No 24 galvanised corrugated sheet, of dimensions and shape as indicated on drawing of details. Gutters shall be built in one piece on each side of roof, shall be fitted with end caps, and mounted in perfect alignment so as to prevent water accumulation.

- **Metal Air Grates:** In order to provide ventilation of air spaces, 0.20 x 0.40 m metal air

grates shall be provided and installed, spaced every 2.00 m as indicated on drawing of facades.

- **Wind Turbine Ventilators:** As a supplement to the ventilation system of air spaces, a series of Ø 0.65 m wind turbine ventilators shall be provided and installed, as indicated on drawings of ceilings. Ventilators shall be of aluminium construction with centring adjustment consisting of 19 mm drawn aluminium tubing with galvanised sheet central cover and auxiliary cover. The axis shall be mounted on bearings. Ventilators shall have concave and convex 5 mm aluminium blades, with no welding points of any kind. All joints shall be made of aluminium rivets.

## 14- PAINTS

### 14.1- Latex for Ceilings:

A latex primer layer shall be applied on all fixed ceilings, followed by two layers of acrylic latex ceiling paint.

Obs: Completed 100%

### 14.2- Latex for Interior:

A latex primer layer shall be applied on interiors (at spaces as specified on Schedules of Spaces), followed by two layers of acrylic latex interior paint.

Obs: Completed 100%

### 14.3- Latex for Exterior:

A latex primer layer shall be applied on exteriors, followed by two layers of acrylic latex exterior paint.

- Exterior wall bases: the surface of exterior wall bases shall be painted black.

Obs: Completed 100%

## 15- ALUMINIUM CARPENTRY

All the carpentry to be provided and installed shall be of EKONAL line white pre-painted aluminium, and shall be mounted on aluminium pre-frame.

- **Designs:** Details, dimensions, and appurtenances of the different types to be utilised are specified and illustrated on drawings of details enclosed in this document.

- **Inspections:** The Site Inspection may inspect the manufacture of all carpentry at workshops and discard those items that do not comply with the specifications, dimensions, or shapes required.

- **Manufacture:** Only carpentry manufactured by carpentry workshops shall be allowed having certificates issued by the manufacturer of the items to be used.

- **Glass panes shall be included with carpentry.**

- **General Facts:** The glass panes utilised shall have flat and parallel faces, and be free of scratches or any other defect. At the time of the provisional acceptance, all glass panes shall be clean and unbroken. The types and dimensions and fixing systems shall be as specified on carpentry drawings.

Obs: Completed 100%

## 16- METAL CARPENTRY

- **Designs:**

Details, dimensions, and appurtenances of the different types to be utilised are specified and illustrated on drawings of details enclosed in this document.

- **Inspections:**

The Site Inspection may inspect the manufacture of all carpentry at workshops and discard those items that do not comply with the specifications, dimensions, or shapes required.

- **Glass panes shall be included with carpentry.**

- **General Facts:** The glass panes utilised shall have flat and parallel faces, and be free of scratches or any other defect. At the time of the provisional acceptance, all glass panes shall be clean and unbroken. The types and dimensions and fixing systems shall be as specified on

carpentry drawings.

They shall be delivered painted in a colour to be indicated by Site Inspection.

**- Synthetic enamel paint for metal carpentry:**

**- General Facts:** Paint work shall be conducted on clean, dry, and dust-free surfaces. Any surface defect shall be repaired prior to painting, and once painting is completed careful retouching work shall be done. All necessary precautions shall be taken to protect the work from dust, rain, etc. The Contractor shall notify the Inspection whenever a coat of paint is to be applied. Different tones shall be used to differentiate paint coats. If possible, each paint coat shall be properly applied on the whole work before the next coat is applied.

The final coat shall necessarily be applied once all other workers involved in the project have completed their tasks. A perfect finish is a sine qua non condition for the final acceptance of the work, so that no brush marks, hairs, etc. shall be left.

All tints shall be prepared to the Inspection's entire satisfaction, being the Contractor in charge of making all the samples required for the selection of colours and tones needed for whitewashing and painting. The application of the different types of paint shall be performed according to manufacturer's instructions (with a brush, sprayer or roller), while complying with the paint dilution ratios.

When colours are to be prepared on site, the Contractor shall calculate the amounts required to cover the whole surface to be painted, as no colour tone differences shall be accepted.

Paints, varnishes, etc. shall be delivered on site in their original containers, which shall be closed and supplied with a warranty seal. Such containers shall not be opened without the Inspection's approval.

All materials to be utilised shall be of the best quality of their kind and of an accepted brand.

This item is included in the metal carpentry budget.

Obs: Completed 100%

**17- PLUMBING**

**- General Facts:**

**- Regulations:** Plumbing (for potable water and sewage) shall be laid out as indicated on drawings, enclosed technical specifications, and ERSACT (Water Supply and Sewerage Regulatory Agency of Tucuman) and SAT (Tucuman Water Board) regulations.

**Boring:** No boring shall be allowed in reinforced concrete or masonry elements for pipe installation.

**Samples:** The Contractor shall submit in advance the samples of the products to be utilised for the Inspection's consideration.

**Joints:** Both the supply of cold and hot water shall be provided with elements and components having thermo fusion joints. Threaded joints shall not be accepted.

**Cold water supply:** blue Hydro 3 pipe with thermo fusion fittings, running up to the reservoir water tank, where a 3" distribution line shall be fitted, with as many supply lines as indicated on drawings. The horizontal and/or vertical lines shall in no case be installed through structural elements, the water supply system layout being designed in compliance with this requirement, which shall not be modified under any circumstance. Weather-exposed lines shall be conveniently protected with heat insulation and UVR filters. Cold water shall be supplied to washbasins, hipbaths, urinals, showers, water tank heaters, plant sinks, and taps. Prior to supplying pipes, plumbing fixtures, and taps, the Contractor shall submit samples of the materials to be installed for the Inspection's consideration.

**Hot water supply:** green Hydro 3 1", ¾" and ½" pipes with thermo fusion fittings. Supply shall be direct from the reservoir water tank to the water tank heater, and then to ¾" distribution lines and ½" lines to fixtures. The horizontal and/or vertical lines shall in no case be

installed through structural elements, the water supply system layout being designed in compliance with this requirement, which shall not be modified under any circumstance.

**Sewer lines:** The sewer line from the washing area shall run from a tank installed in the washing area through a pipe to the exterior, and then empty on an open-air drainage canal.

At space L3, the gratings that collect the water from the washing area are connected to the exterior through a PVC pipe discharging into an open-air drainage canal.

In the western sector, the primary and secondary drainage system shall consist of 110 and 63 AWADUCT pipes discharging from all plumbing fixtures to be installed; 1:60 slopes; pipes shall be laid into trenches free of solid elements that might cause damage, on a 5 cm sand bottom, with cement mix fixing systems at bend with base, intakes, yard sinks, etc. Sewage effluents shall be discharged into a septic tank and cesspool. The system shall be equipped with air grates to ensure its correct operation and allow for the release of gases, which shall be located as indicated on drawings, and be fitted with hoods as required, and in all cases rise 2 m above the cover. They shall be braced to the walls with 1/10" x 1/2" metal clamps and 2 Fischer 56 plugs spaced every 1.20 m.

The system shall include inspection tanks to facilitate free access to pipes. The 0.60 x 0.60 tanks shall be made of premoulded compressed concrete, with plain concrete bearings with 1:3 polished concrete finish, 5 cm concrete cover and frame. The joints between pipe and tank shall be perfectly sealed to prevent leaks.

Intakes shall be covered with 0.20 x 0.20 compressed concrete covers and bronze cover; the open yard sinks shall have 0.15 x 0.15 bronze gratings.

The bathroom units shall be equipped with ANDINA line fixtures, stainless steel washbasins fitted into marble tops.

The bathroom fixtures shall include shower soap dishes, pegs, toilet paper holders, and shampoo and towel dispensers.

The septic tank shall comply with the project drawings and have 0.15 m masonry walls, built on mortar and with waterproof plastering, as specified on bathroom drawings.

**Cesspool:** The sewage system shall be supplemented with a cesspool of dimensions and location as specified on drawings.

**Curb:** The cesspool shall be fitted with a 0.30 x 0.20 concrete curb to hold cover.

**Cover:** of reinforced concrete with  $\emptyset$  10 mm two-way reinforcements spaced every 0.12 m.

**Rings:** The cesspool shall be lined with 0.05 m reinforced premoulded concrete perforated rings from top to bottom.

**Ventilation:** through a 110 mm PVC pipe with bends and hood, 2.5 m in height.

**Rainwater drainage:** All the necessary work shall be performed for the correct drainage of rainwater from roofs. Gutters shall be made of 0.15 x 0.20 m galvanised sheet, with drop outlets of same material and AWADUCT  $\emptyset$  110 downspouts braced to the exterior walls with 1/10" metal clamps and Fischer 56 plugs spaced every 1.20 m. The horizontal gutter sections are specified on drawings. The rainwater shall be emptied onto an open-air canal. All the necessary work shall be performed for an efficient and correct supply of bottled gas, which shall be provided by means of a gas storing tank and a connection to the ESKABE 85 litre high-recovery heater (800 litre/h).

Works include gutter installation, pipe provision and installation, appurtenances and shutoff valve, assistance of other industry tradespeople in the job, water tightness testing, and fixture

provision and installation.  
Obs: Completed 100%

## 18- ELECTRICAL INSTALLATION

**General Facts:** The electrical installation shall be performed as specified on drawings, calculations, and the enclosed technical specifications. It shall also comply with municipal and EDET (Tucuman Electricity Distribution Company) regulations.

- **Main connection:** The connection installation shall be performed as follows:

- **Disconnecter:** An NS 100 N-R 28 Merlin Gherin compact switch with 63-80 A regulation shall be installed on the existing board at space No 23 (chamber).

- **Underground mounting:** From this NS 100 N-R 80 switch, a 4x16 mm<sup>2</sup> underground copper cable shall be laid out up to space 16, where it shall climb the wall through a 1 ½ galvanized tube up to a 100 mm perforated tray extending throughout the perimeter of space 16 up to space 14, where the plant's main switchboard shall be installed.

The tray shall be braced to the wall with a normalised galvanized bracket. A 1x16 mm<sup>2</sup> PVC copper cable shall be laid out all along the tray and connected to it on 4 points by means of bolts and copper terminals.

The cable shall be buried at a depth of 0.6 m, with a brick mechanical protection at 0.20 m from the cable, and an underground warning tape 0.20 m higher up.

- **Main Switchboard:** The equipment shall be Modular 97 Series, DWG No 18 metal sheet, 450x700x225 mm, watertight, IP 55, with polyester epoxy powder electrostatic paint, GEN-ROD or similar type.

It shall be equipped with a voltmeter and an ammeter, both digital 0.5 class Nollman type or similar, with its corresponding selector switches.

The front shall have three 200 V red lights to indicate voltage.

The connection cable is installed through an NS 100 N-R 80 Merlin Gherin type or similar compact switch and then up to a 30x5 mm copper bar set on bar holder insulators.

The output thermo magnetic switches of the 2 circuits shall be of the Merlin Gherin type or similar, H curve, 10 KA circuit breaker, 4x32 A, and shall be mounted on a DIN normalised rail. One of the switches shall control the supply to the cold chamber, while the other shall control the supply to the lighting disconnecting board which shall be installed by the main switchboard.

All cable entry and exit points on the board shall be through a hole on the board of the width and depth of the tray.

The perimeter of the hole shall have click-on fittings.

The protection and controls of 3 three-phase 3 KW motors shall be installed (current values shall be adjusted on site) consisting of a single-pole fuse holder cylinder with fuse, contactor, thermal relay, reverse-phase and phase-fault relay, and other fixtures.

- **Disconnecting Boards:**

- **Chamber Disconnecting Board (existing):** A new supply shall be connected to this board from the main switchboard by means of a 4x6 mm<sup>2</sup> underground cable to be installed on tray.

- **Lighting Disconnecting Board:** made of DW 18 sheet, watertight, with perforated back, DIN system, IP55 protection, with polyester epoxy powder electrostatic paint, GEN-ROD or similar type.

All plant lights and outlets are controlled from this board, except for the cold chamber. The thermal switches to be used on this board shall be of Merlin Gherin P 60 or similar type, 4.5 KA circuit breaker.

**- Pipes and Cables:**

- **Pipes:** In all cases, medium-weight iron pipes, MOP-type, 1.21 wall, which shall be repainted if paint is lost during bending or any other type of work performed on them. They shall be embedded with 1:3 sand-cement mortar.

- **Cables:** copper cables with flameproof flexible PVC insulation, in compliance with IRAM NM 247-3, Pirelli or similar standards, shall be used for pipes, while Sintenax cables shall be used on tray, with the exception of ground cable.

- **Switches and outlets:** They shall be of the modular key type (SICA habitat or similar).

**- Thermo magnetic Switches and Circuit Breakers:**

- **Thermo magnetic Switches:** Each disconnecting board shall be fitted with two-pole or four-pole switches, as required, 4.5 KA circuit breaker, Merlin Gherin or similar type. The Main Switchboard shall have a 35 A circuit breaker main switch and two 4x32 A output thermal switches, 10 KA circuit breaker.

- **Circuit Breakers:** The circuit breakers to be provided and installed shall be of Merlin Gherin or similar type, with 30 MA sensitivity.

- **Cable Trays:** The cable trays to be provided and installed shall be made of hot-dipping galvanised perforated steel sheets for internal use, of dimensions as specified on drawings. They shall be firmly braced to masonry or reinforced concrete elements by means of Fischer-type plastic plugs and screws or screw spikes, as required. All appurtenances shall have same quality as the trays (bends, joint couplings, etc.)

- **Fixtures:** The following lighting fixtures with the corresponding lamps shall be provided and installed at the locations as indicated on drawings – Globe fixture with polycarbonate cover, accessory equipment, 150 W Na lamp, and 11/4 x 1 m GI arm (3 on exterior walls with photocell). Globe fixture with polycarbonate cover, accessory equipment, 150 W Hg steam lamp, for hanging (2 at space 1). Bell-shaped fixture, 50 cm in diameter, with polycarbonate globe cover, accessory equipment, and 400W halogen Hg lamp (8 at space No 4 and 4 at space No 16). Fluorescent fixture, 2 x 36 W, watertight, with Marea polycarbonate cover or similar type (2 at space No 3, 1 at space No 5, 1 at space No 6, 1 at space No 12, 2 at space No 17, and 1 at space No 20).

- **Grounding:** All pipes shall be fitted with a 1x2.5 mm<sup>2</sup> green-yellow PVC copper ground cable, which shall be connected to the boxes by means of a 3/16 x 11/2" galvanised bolt and copper terminals. The trays shall have a 16 mm<sup>2</sup> ground cable, connected to it on four points by means of galvanised bolts and copper terminals.

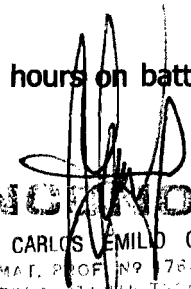
As specified on drawing, 3 grounding connections shall be installed with Coperweld grounding rod and 1x25 mm<sup>2</sup> bare copper cable joined together by means of a copper/aluminium weld.

- **Remote controls:** Remote controls shall consist of IP 65 watertight aluminium boxes containing the on-off switches for each motor which shall be connected to board through a 3x1.5 mm<sup>2</sup> copper underground cable. Power cables shall be 4x6mm<sup>2</sup> underground copper cables, and be laid on trays.

A C-shaped section shall be used to link tray to each motor.

- **Emergency lights:** Battery-backed 20W lighting devices lasting 5 hours on battery power, Atomlux or similar type.

Obs: Completed 100%

  
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## 19- EQUIPMENT

### General Facts:

Provision and installation of 8 (eight) 12 person double-tier(6/6) metal lockers, with central shelf in each cabinet, fitted with key lock and padlock. Lockers shall be 1.80 m in height x 1.60 m in width x 0.40 m in depth. Made of No 24 metal sheet with high-impact 30 x 30 square tube legs, synthetic enamel paint finish, bakeable at 130°C following degreasing, deoxidizing, and phosphating. Grey pearl finish colour.

Provision and installation of 4 (four) stools made of white laminated plastic and metal frame with same treatment as lockers. Grey pearl finish colour.

Obs: Completed 100%

## 20- PERGOLA

**General Facts:** As indicated on enclosed drawing.

Obs: Completed 100%

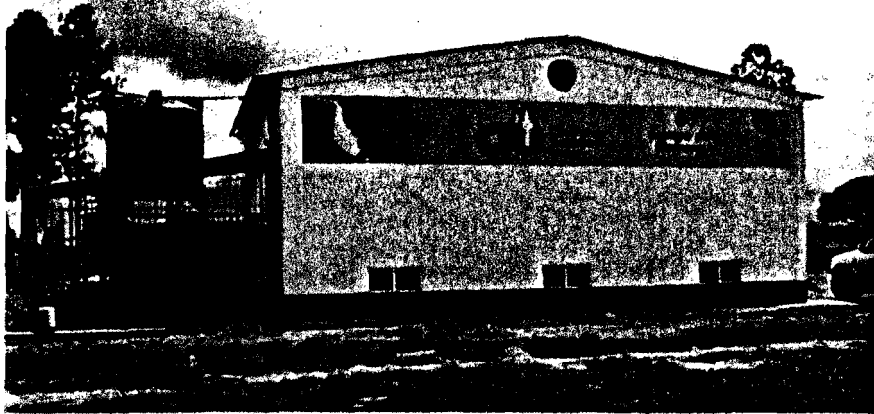
One adds roof of transparent sheet

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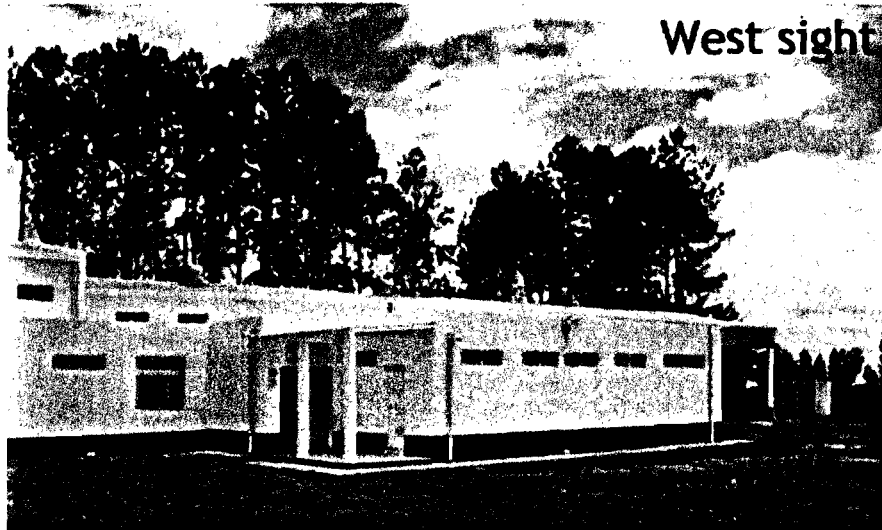


# PHOTOS OF THE FINISHED WORK

North sight



West sight



West sight

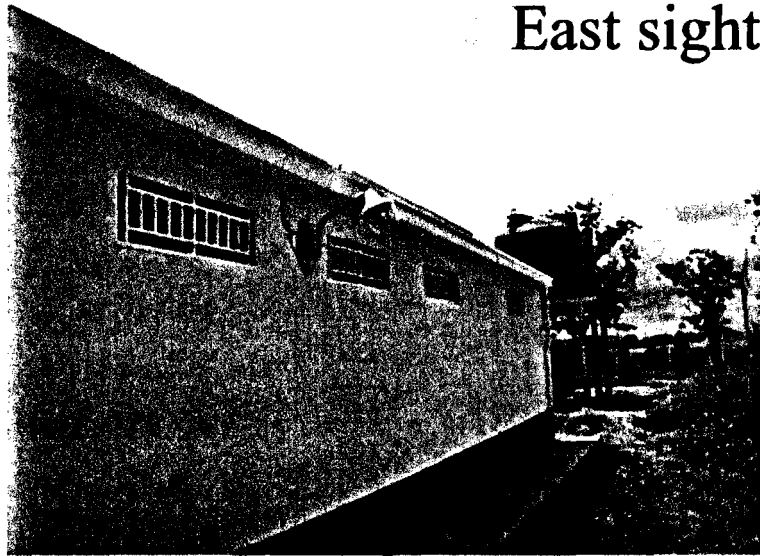


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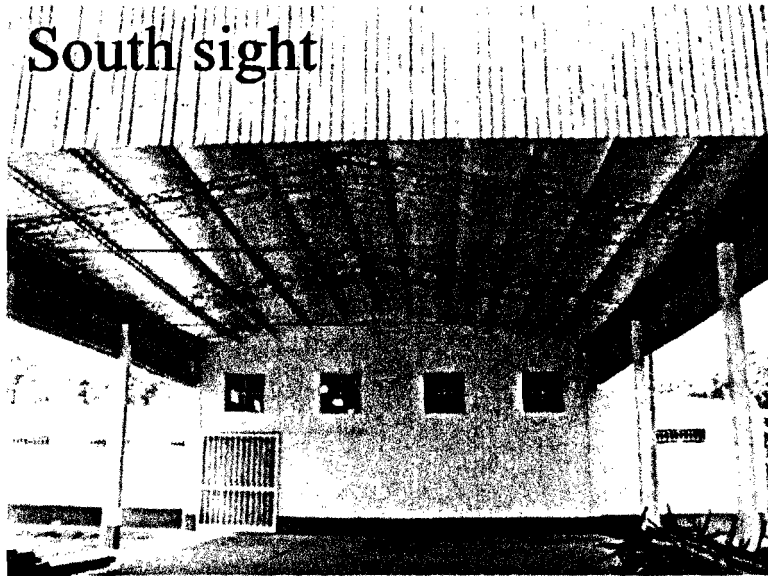


PHOTOS OF THE FINISHED WORK

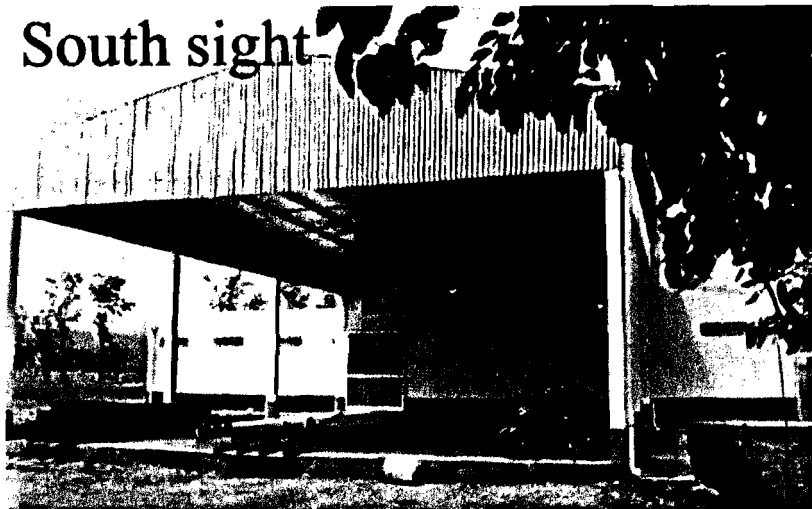
East sight



South sight



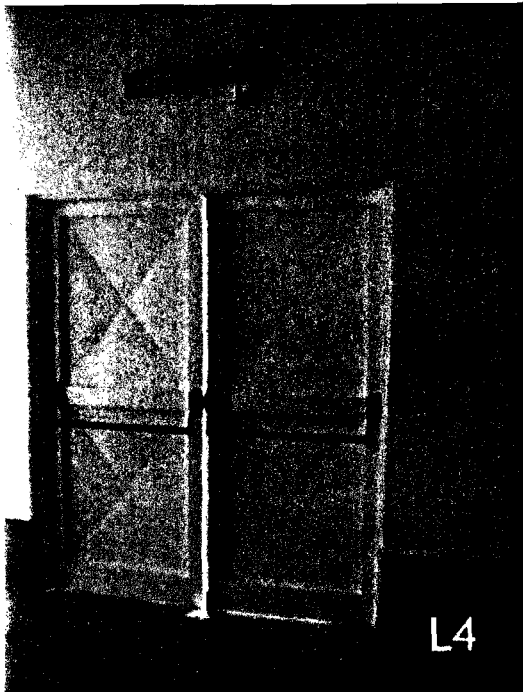
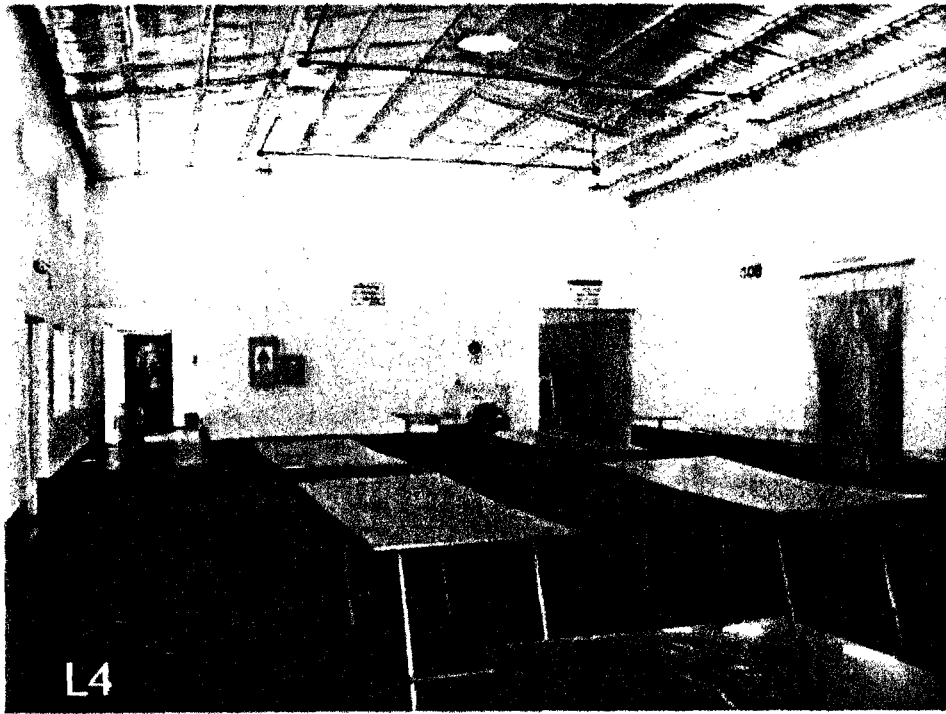
South sight



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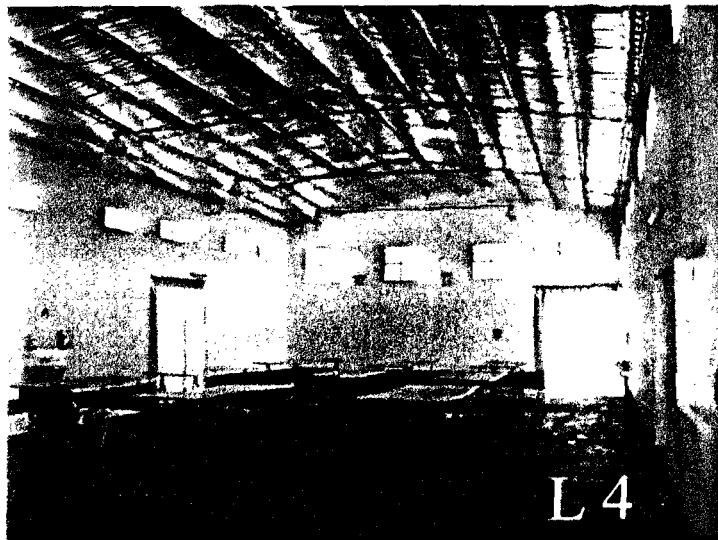
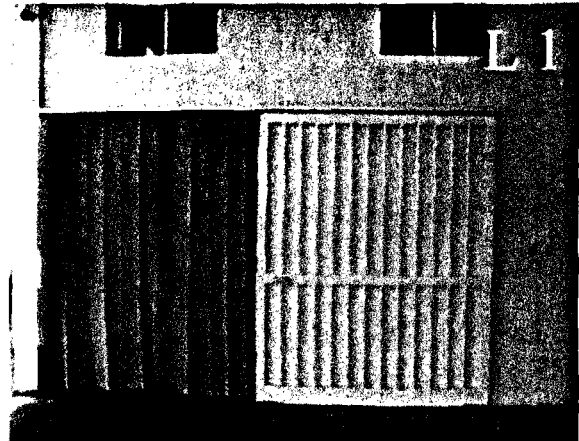
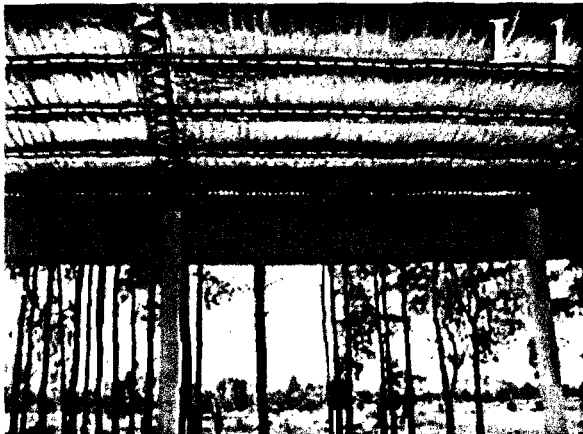
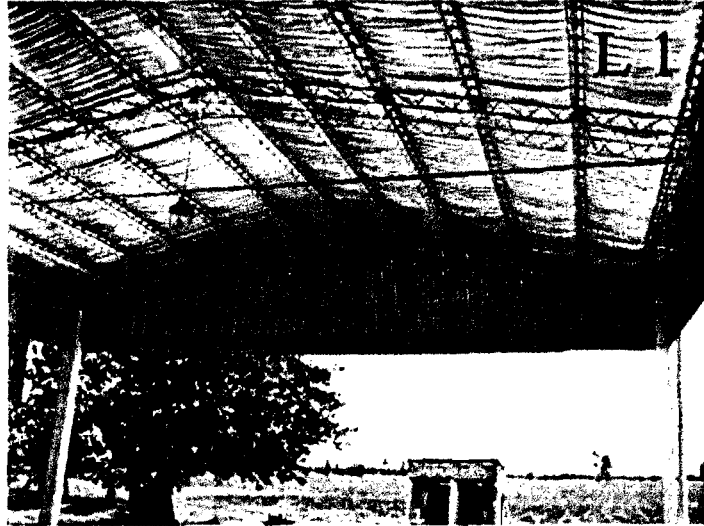


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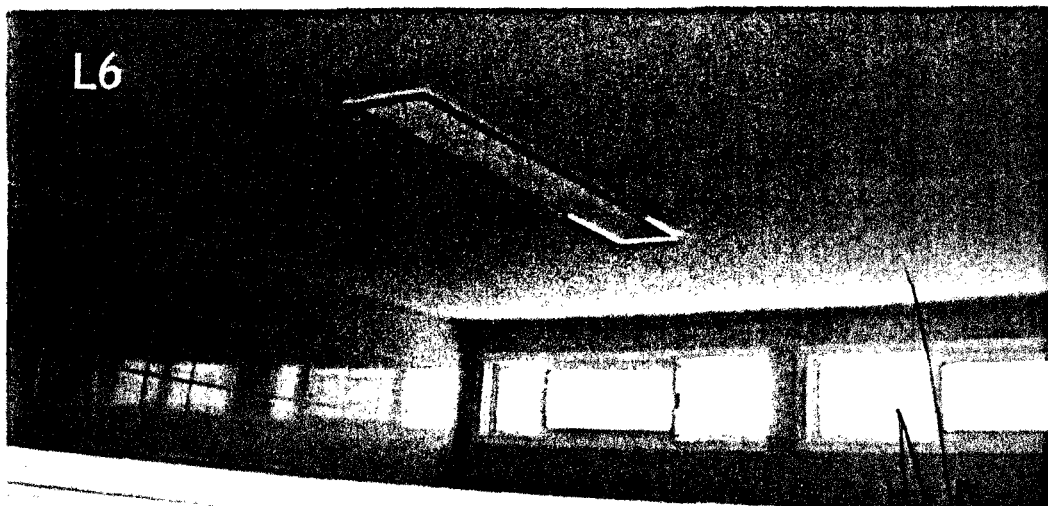
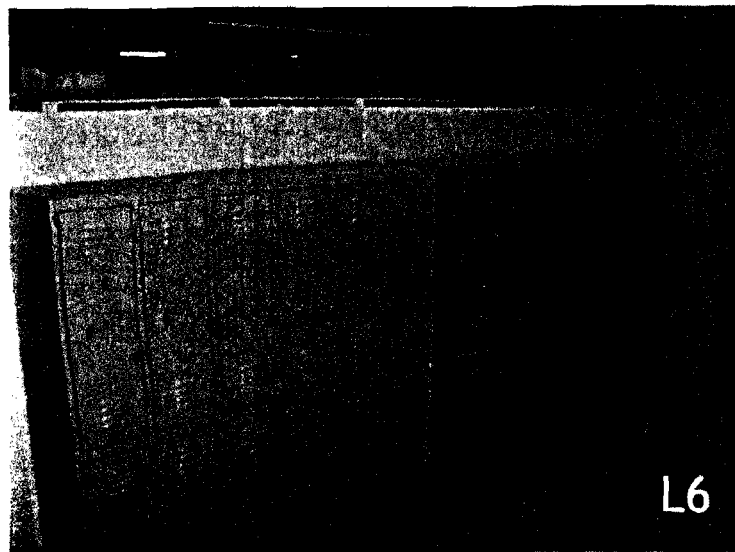
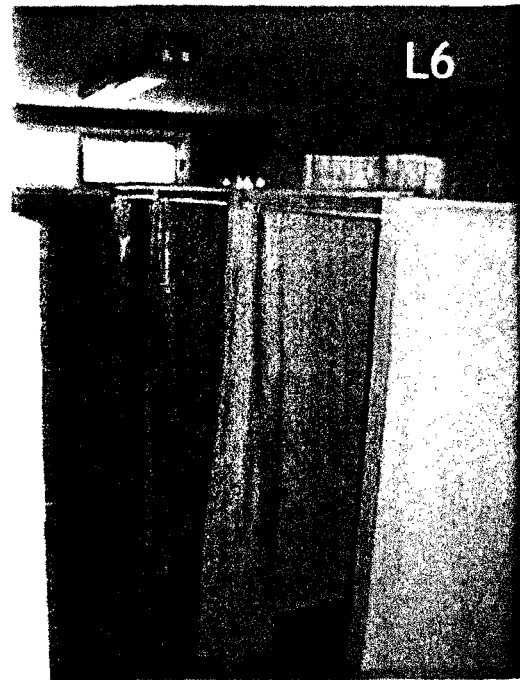
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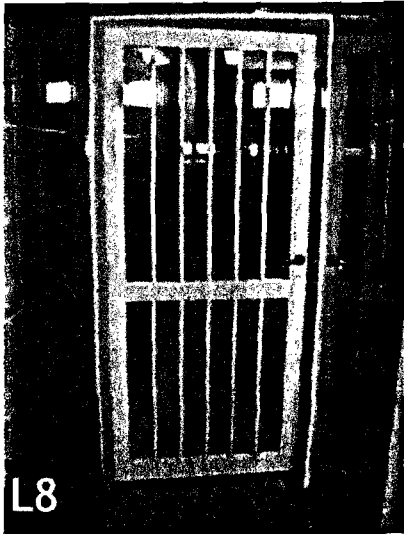
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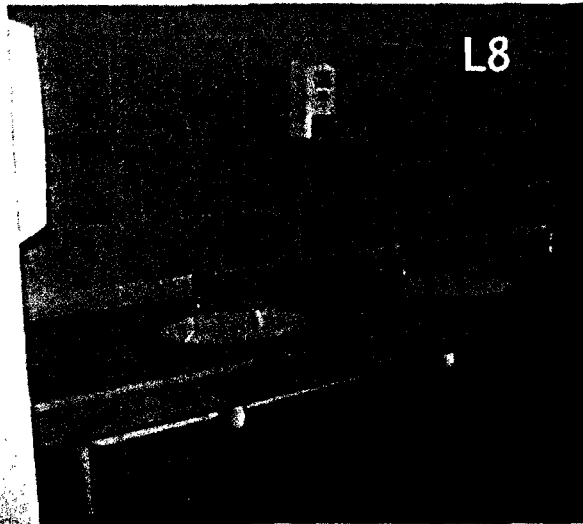


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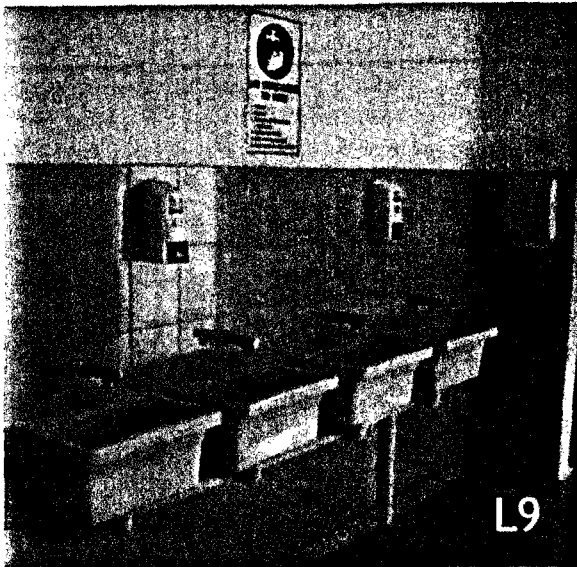
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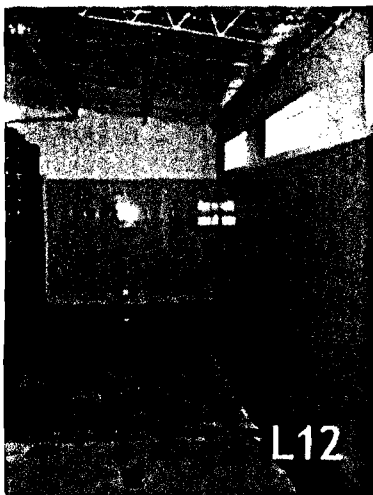
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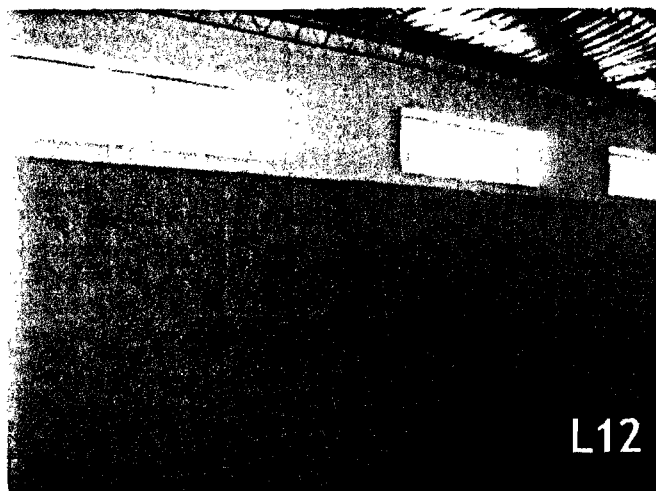
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L9

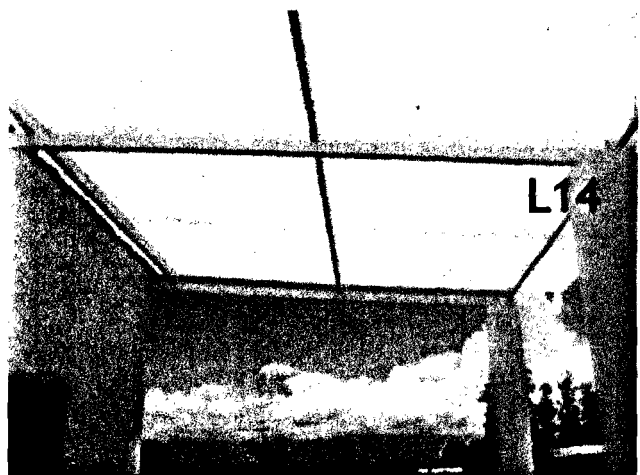
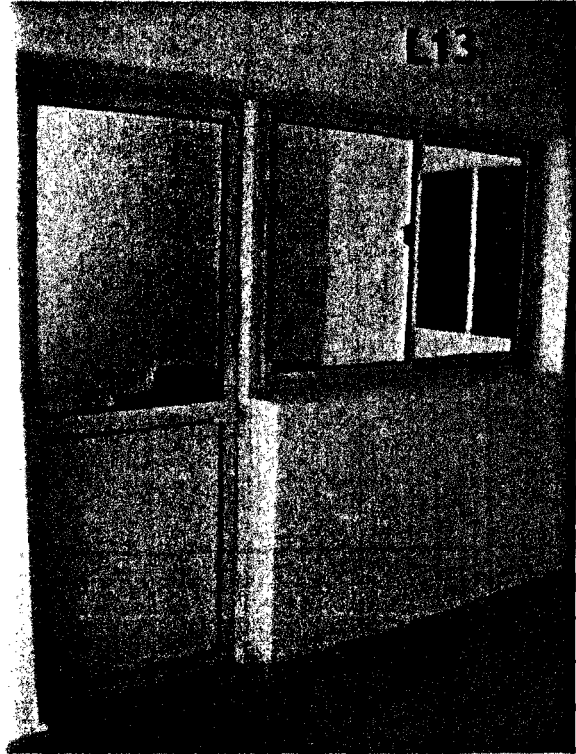
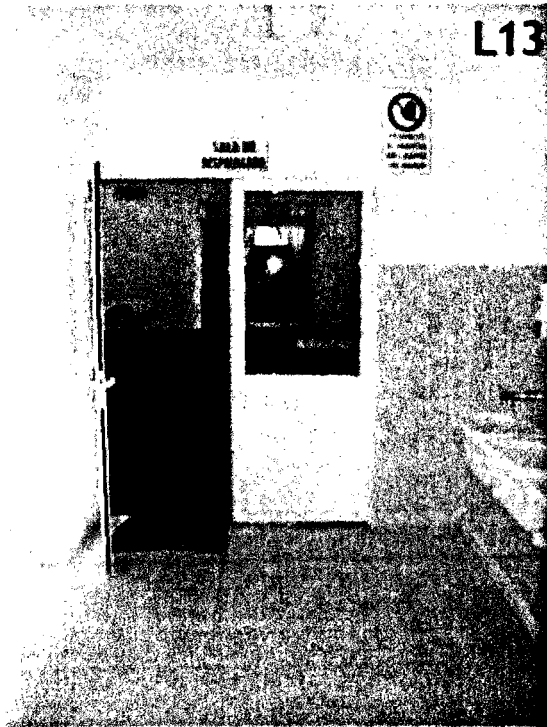


L12



L12

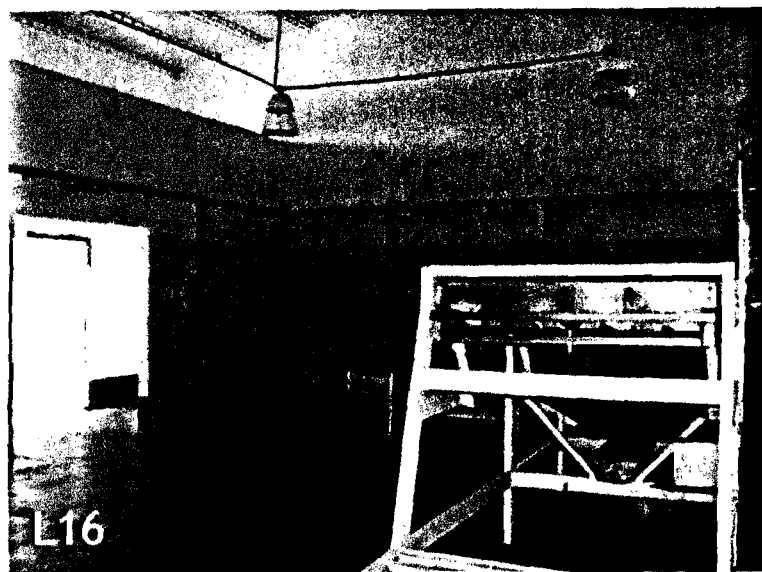
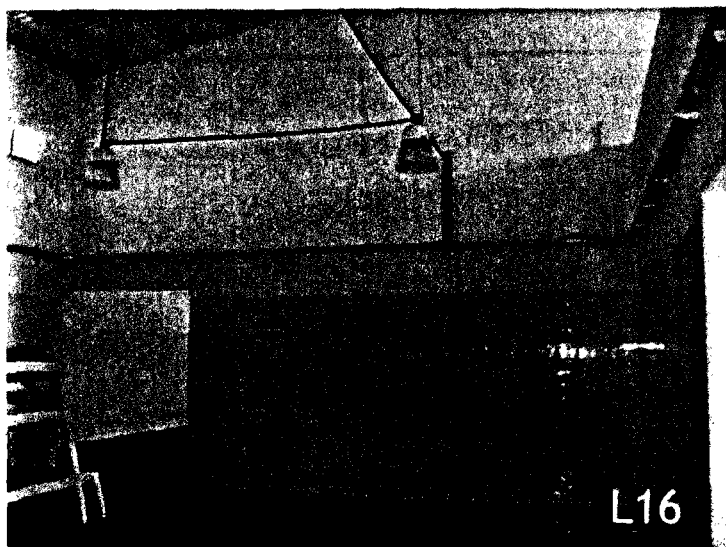
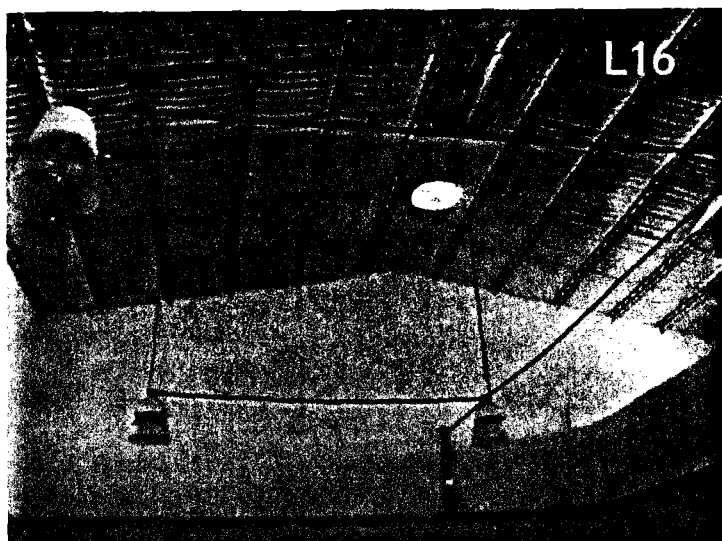
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# PHOTOS OF THE FINISHED WORK



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