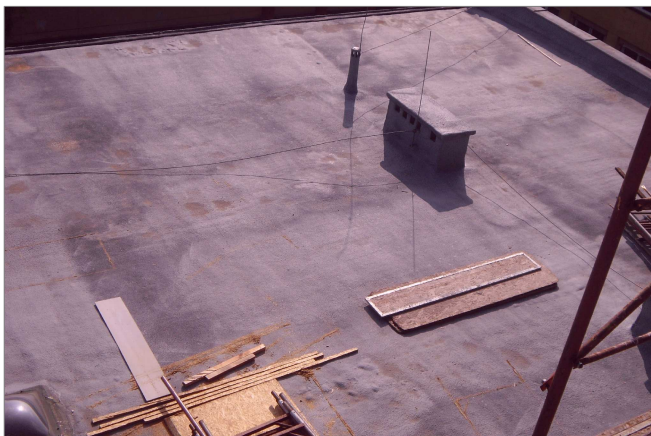
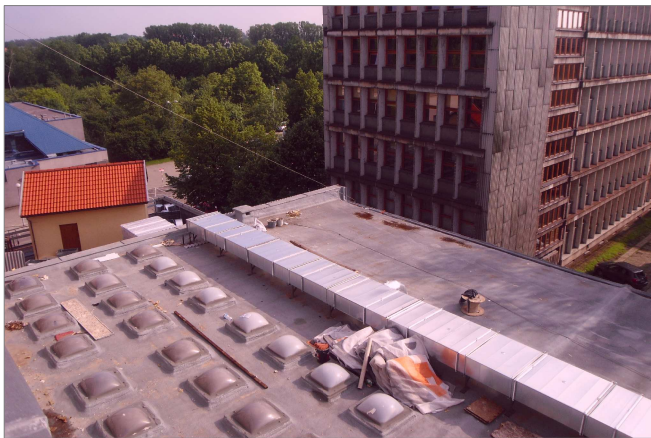


**DESCRIPTION:** Humidity in two different areas on the top floor of the building. Heating in the deck, It doesn't comply with thermal conditions

PHOTOGRAPHS:



POSSIBLE CAUSES:

- Not passable cover**
- Drains with insufficient slope or diameter
  - No maintenance of drainage pipes
  - Enough deck slope.
  - encounters with skylights poorly resolved
  - The outer perimeter of the cover does not have a minimum vertical extension waterproofing layer on the vertical surface (in some parts there is not forechest)
- Passable cover**
- Poor quality pavement material that absorbs too much water because of a high porosity.
  - Lack of sufficient sumps
  - Cloths deck with insufficient slope
- General causes**
- Waterproofing layer poor placement or absence of this.
  - Insufficient insulation thickness. Cover warming

INTERVENTION:

1. The steps to intervene successfully on this pathology are:

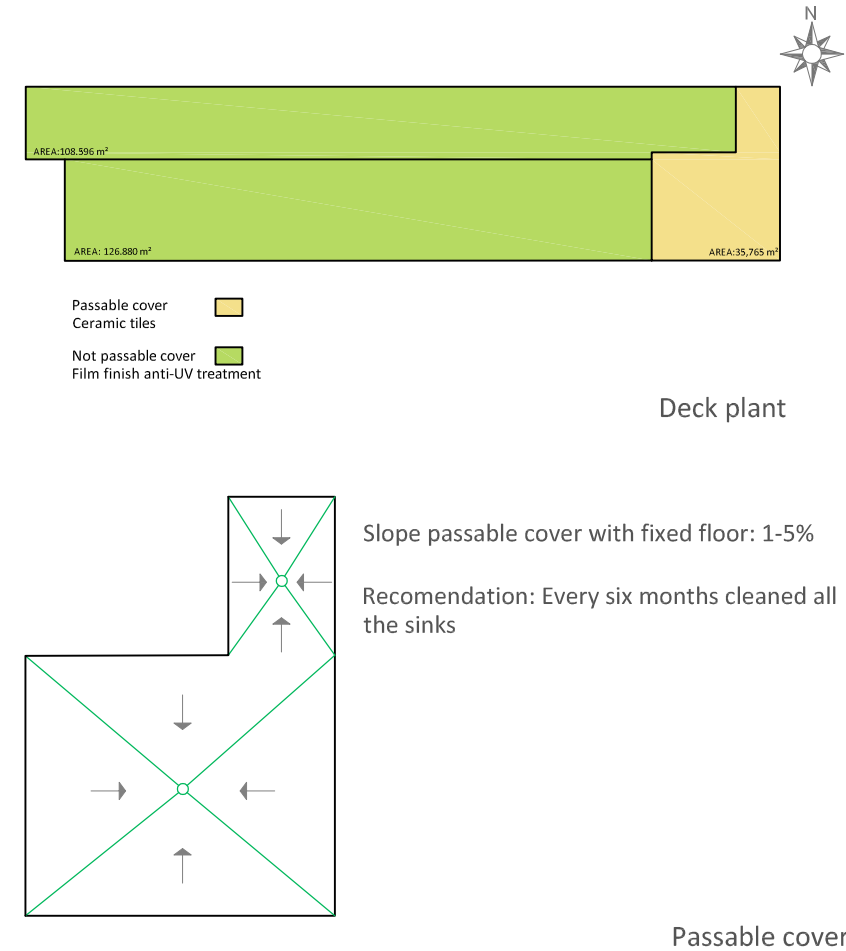
**Not passable cover**  
Not passable cover 11cm increasing insulation (currently 7 cm)

THERMAL TRANSMITTANCE

Regulation  $U = 0,25 \text{ W / m}^2 \text{ K}$

Increasing the thickness of polyurethane insulation 10cm  $U = 0,23 \text{ W / m}^2 \text{ K}$

LOCATION:



**Passable cover**

- Remove layers from the deck to reach the wrought
- Rerunning all the layers (detail 1) placing another sump.

- Placing the covering layers, increasing the thickness of the insulation

CTE DB-H1 Table 4.6 number of sinks depending on the deck area.  
For areas less than 100m2, 2 sinks

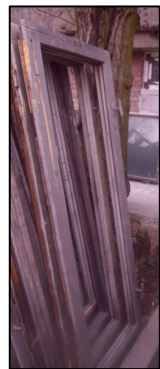
THERMAL TRANSMITTANCE

Regulation:  $U = 0,50 \text{ W / m}^2 \text{ K}$

Increasing the thickness of polyurethane foam ( $\lambda = 0,025$ ) insulation 10cm  $U = 0,46 \text{ W / m}^2 \text{ K}$

**DESCRIPTION:** Most of window frames is deteriorated. The window fittings are rusted.  
The windows of the staircase are made of steel and are oxidized.

## PHOTOGRAPHS:



## POSSIBLE CAUSES:

Because of the weather ,they are continuously exposed to rain, snow ..

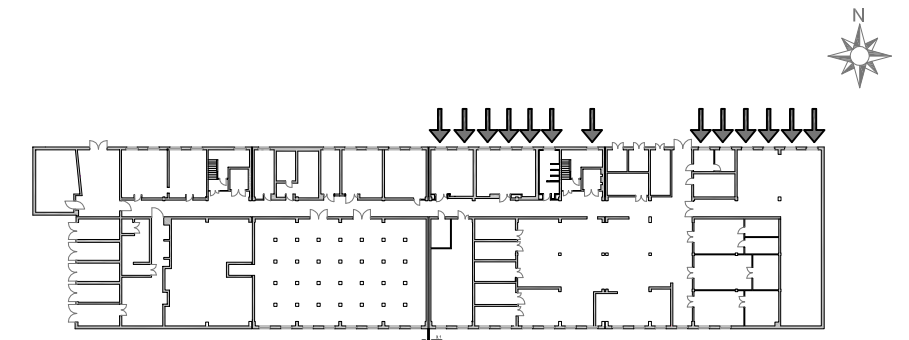
## INTERVENTION:

Change affected window frames and replace PVC windows and change the window sill too.

By aesthetics of the building and to avoid future problems with window frames, recommended to change all the woodwork of the building

The windows will be of PVC material and soundproofing of 40 dB

## LOCATION:



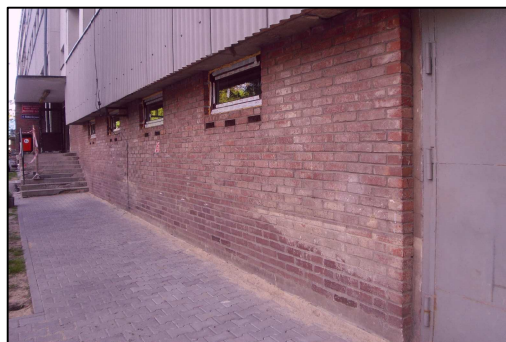
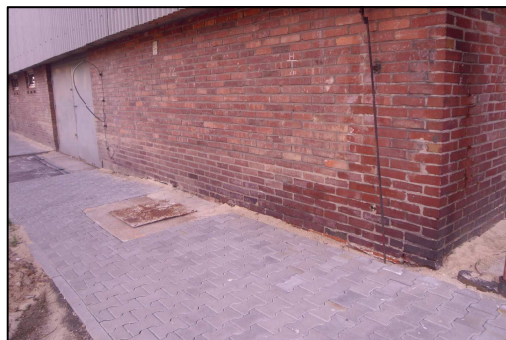
Rusty windows

basement



**DESCRIPTION:** Damp in most of of the facade of the building, at the bottom. observed deterioration of elements, efflorescences and coatings

**PHOTOGRAPHS:**



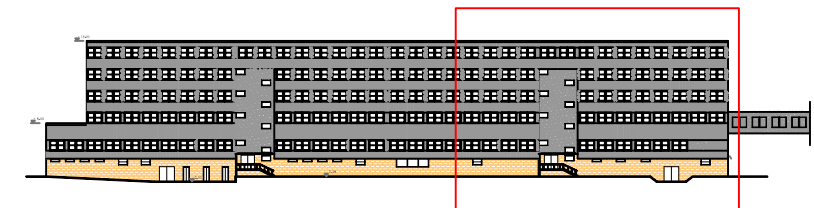
**POSSIBLE CAUSES:**

- Very porous wall material
- Too much water in the subsoil because of ground water table
- Saturation field rainwater
- Water facilities breakage or deteriorated ( pathology 4)

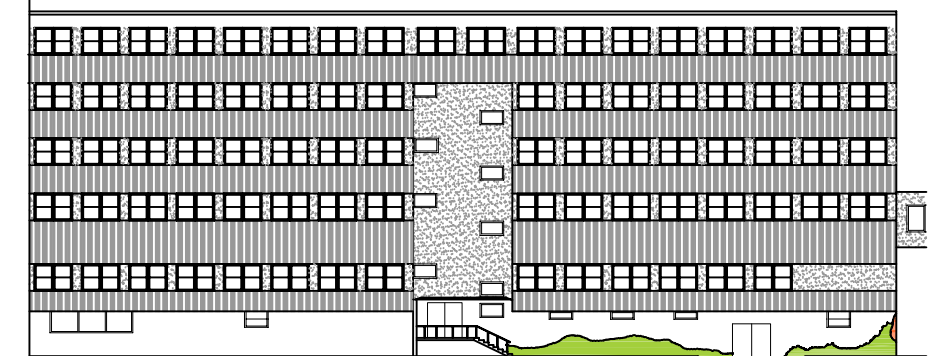
**INTERVENTION:**



1. The steps to intervene successfully on this pathology are:
  - Remove of the whole coating by chopping the entire affected area.
  - Clean all the support by sandblasting.
  - Be placed on electro-osmosis system by pulses of resonance.
  - Coat the entire surface with a special mortar microporous
  - Take the initial state of the facade.

**LOCATION:**



North



-  Damp by capillarity
-  Water filtration because of poor design of the pipe (pathology 4)

**DESCRIPTION:** Poor execution of water pipes. Pipes are poorly subject, and are oxidized. The connetions are not suitable. When there are heavy rains the water don't run through the pipes. The water fall directly to the ground.

**PHOTOGRAPHS:**



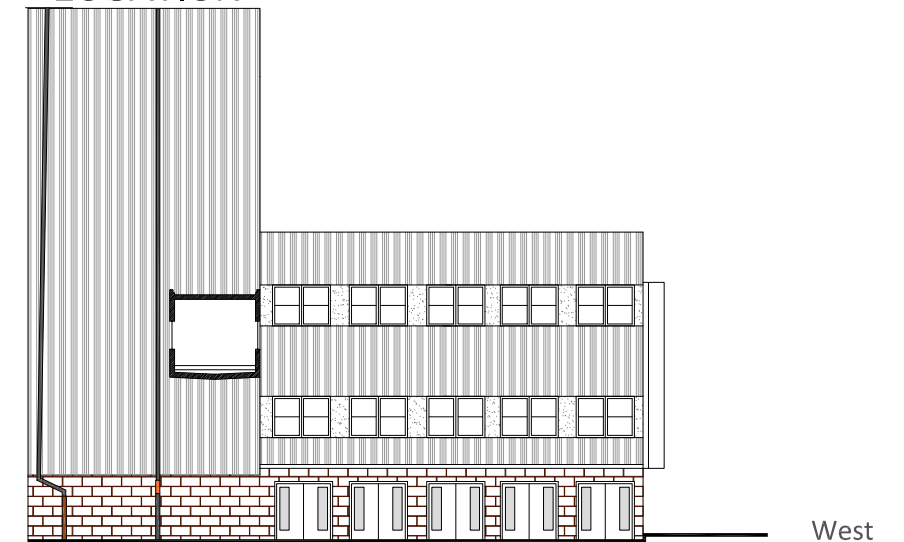
**POSSIBLE CAUSES:**

- Poor design of the pipes
- there is slack between the splices of the pipes

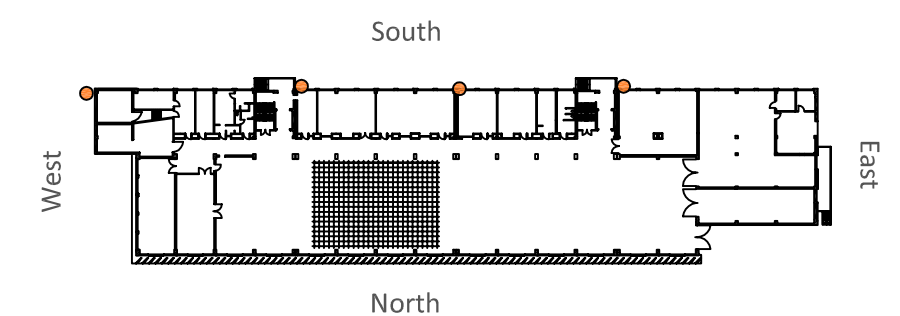
**INTERVENTION:**

Change all downpipes and replace the entire system

**LOCATION:**



South

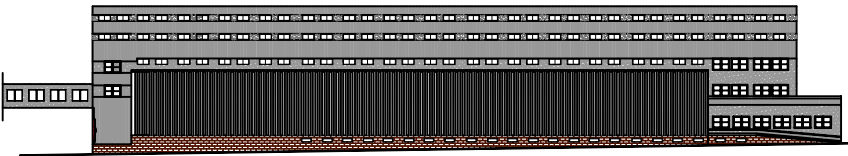


● Situation of pipes



**DESCRIPTION:** With step the years cement fibre corrugated plates have been deteriorated, leaving the interior discovered. Also all the facade does not comply with the thermal conditions. Global warming.

**LOCATION:**



Breakage facade

South

**PHOTOGRAPHS:**



**POSSIBLE CAUSES:**

Breakage facade

- Because of the weather: rain and snow
- Acts of vandalism

warming of the facade

- Insufficient rockwool thickness (insulation)

**INTERVENTION:**

Given that the facade finished with fibre corrugated plates and with smooth plates bolte does not meet regulations regarding thermal transmittance and is generally in in very poorcondition. The recommendation would be to change the entire facade increased insulation rockwool and complying with:

Brick cladding (Basement floor)

Existing wall  $U = 2,33 \text{ W / K}$  -- > no cumple con la normativa

Regulation:  $U = 0,90 \text{ W / K}$

Increasing the thickness of polyurethane insulation 5cm  $U = 0,41 \text{ W / m}^2 \text{ K}$

Enclosure finish with smooth plates bolted :

Existing wall:  $U = 4,55 \text{ W / m}^2$

Regulation:  $U = 0,65 \text{ W / m}^2 \text{ K}$  para  $t \leq 16^\circ \text{ C}$

Increasing the thickness of rockwool 14cm  $U = 0.50 \text{ W / m}^2 \text{ K}$

Enclosure finished with fibre corrugated plates:

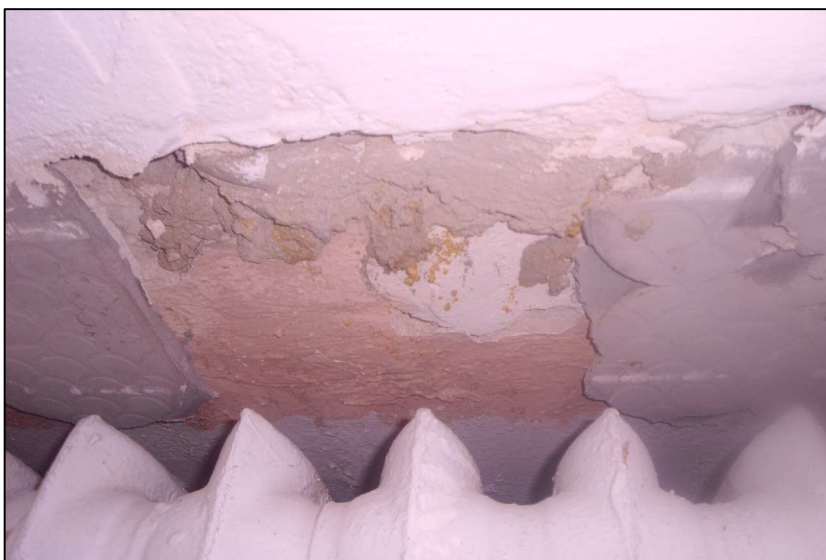
Existing wall:  $U = 1,49$

Regulation:  $U = 0,30 \text{ W / m}^2$

Increasing the thickness of rockwool 14cm  $U = 0,29 \text{ W / m}^2 \text{ K}$

**DESCRIPTION:** Some tiles have fallen and others are bulging. The pathology is in a wet area of the building

**PHOTOGRAPHS:**



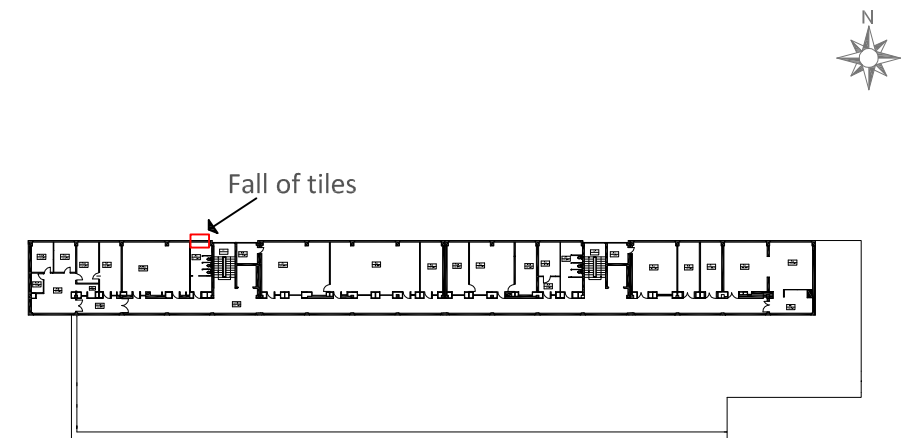
**POSSIBLE CAUSES:**

- Moisture
- Poor quality plaster
- Tile placement without prior wetting
- Insufficient plaster layer
- Exposure to high temperatures because there are close to a radiator

**INTERVENTION:**

1. The steps to intervene successfully on this pathology are:
  - Removing the tiles bulging
  - Remove the layer of plaster
  - Clean the surface
  - Applying plaster of good quality
  - Placement the tiles wetting

**LOCATION:**



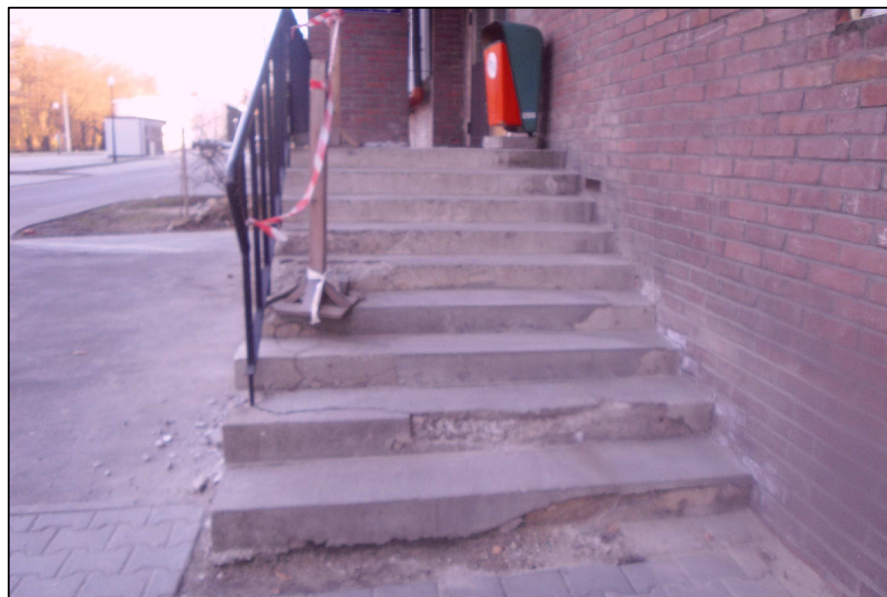


**DESCRIPTION:** Stairs deteriorated by weatherproof. Observe detachment of concrete remaining sight and rusty armour

**LOCATION:**

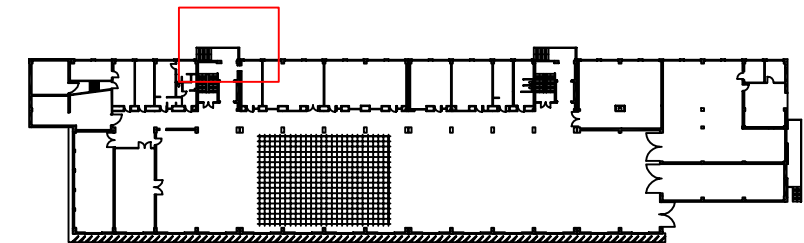


**PHOTOGRAPHS:**



**POSSIBLE CAUSES:**

- Missing armor coating
- Lack of maintenance of concrete
- Corrosion of reinforcements
- Concrete surface without treatment. Observed pilling and oxidized armor in sight
- Abruption of concrete (coating)
- Insufficient vibrated concrete which has produced voids and detachments
- Elevated foot traffic
- Impact on the steps
- Use low strength concrete.



**INTERVENTION:**

1. The steps to intervene successfully on this pathology are:

Down the stairs and remake it, would be a very expensive process is better to perform the following process

- 1- Substrate preparation: for the corrosion steel, clean it with sandblasted
  - 2- Corrosion protection for exposed reinforcement: it comes to apply a dry mortan, comprising high-grade cement, aggregate plus additives, mixed with water. It provides durable protection against corrosion
  - 3- Application of bonding layer: The cementitious Sopro Repadur mortar bonding layer
  - 4- Ensures good adhesion : Apply cementitious, fibre-reinforced. The repair mortar is applied wet-on-wet to the slurry in 1 to 5cm thick coat.
  - 5- Final surface finishing: Sopro Repadur 5 fine PCC concrete filler is used to fill pores and blowholes and to prepare substrate for paint systems or other coatings. The filler may be applied in coats up to 5 mm thick.
- Following post the whole staircase formwork
  - Return to be concreted the areas where lost concrete section

**DESCRIPTION:** Part of the facade without a coating (cement fibre corrugated plates) . Railings in disrepair, it doesn't comply safety conditions.It is made with painted wood and steel. The steel has oxidized some parts Cover water flows directly by the facade causing leaks

PHOTOGRAPHS:



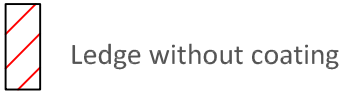
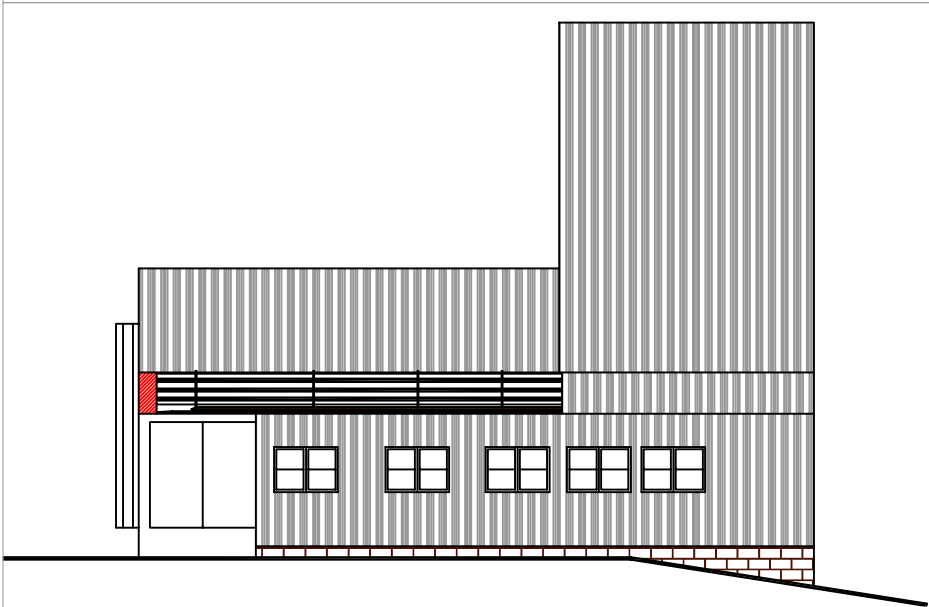
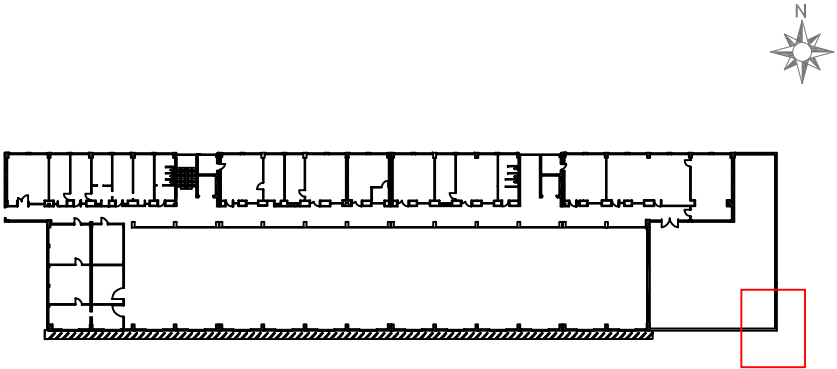
POSSIBLE CAUSES:

- Probably the cement fibre corrugated plates has been withdrawn for safety reasons (perhaps was loose)
- On the other hand, the cover hasn't vertical height and don't formed ledge so for this reason the water falls directly from the front facade and producing by filtration humidities

INTERVENTION:

1. The steps to intervene successfully on this pathology are:
    - Remove cement fibre corrugated plates affected and the rockwool.
- \* According with the intervention performed in the pathology 5

LOCATION:



Currently this is the state of this part of the facade. It is in rehabilitation.  
For this reason the bottom of the banister has no coating.  
Observed deteriorated wooden slats and stains caused by water that runs directly from the front.



**DESCRIPTION:** Expansion joint is dirty and has moisture around. The mineral wool also is not constant along its length. It hasn't sealant, so air and moisture can enter into the joint.

## PHOTOGRAPHS:



## POSSIBLE CAUSES:

- Lack of maintenance and cleaning of the expansion joint
- Meteorological agents

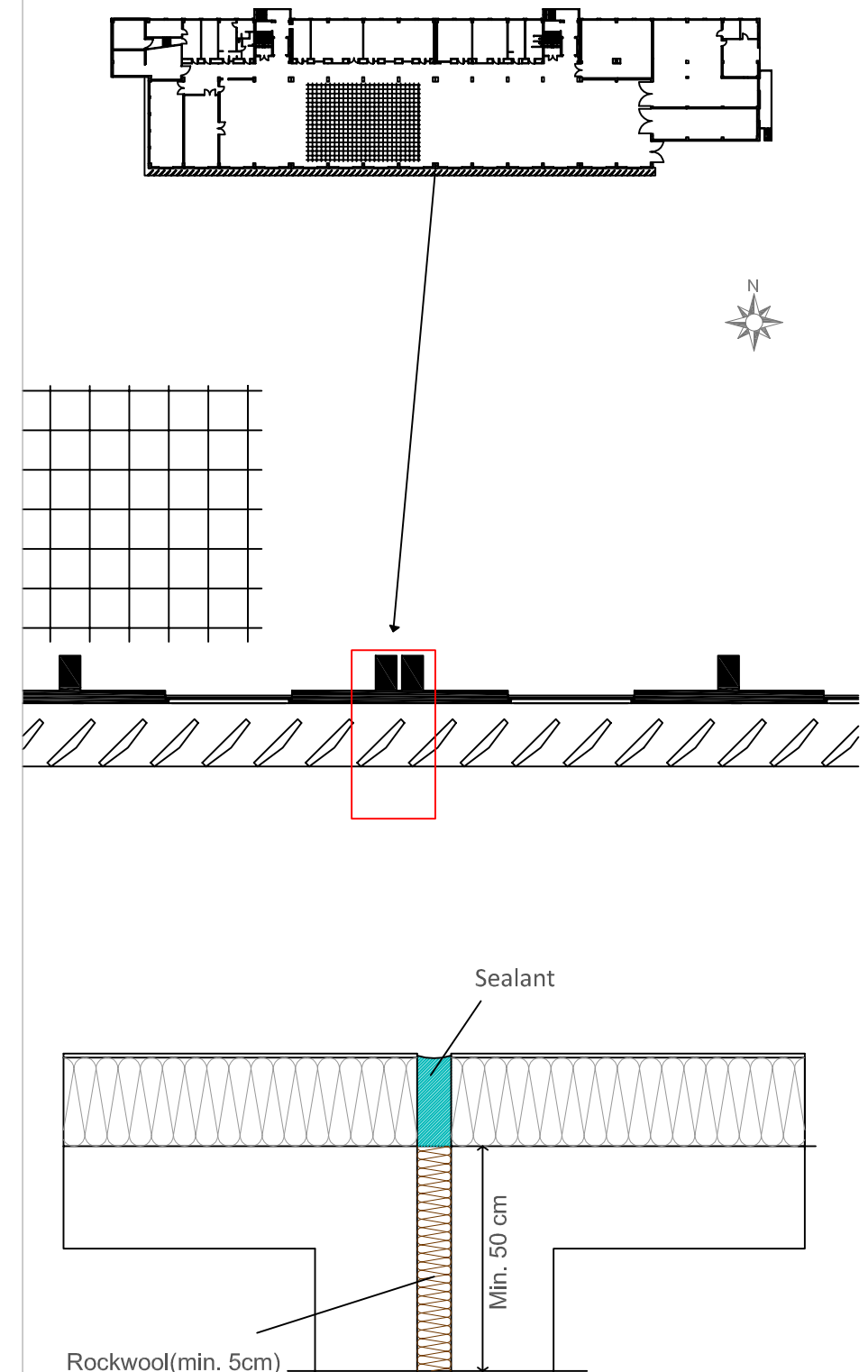
## INTERVENTION:

1. The steps to intervene successfully on this pathology are:

- Clean the entire length of the joint
- Removing rockwool
- Refit rockwool. Minimum depth of rockwool 1cm

The expansion joint aims to absorb the movements of expansion or contraction due to temperature variations. should sealed with elastic fillers that are resistant to mechanical damage and chemical previews. It must be impermeable and resistant to atmospheric agents.

## LOCATION:



**DESCRIPTION:** Concrete facade outgoing where there are water stains, chipping, concrete disintegrations even formation of mold on the surface.

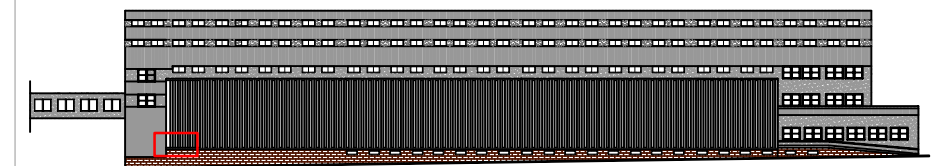
**LOCATION:**

**PHOTOGRAPHS:**



**POSSIBLE CAUSES:**

- Water stagnates resulting moisture and oxidation.
- No dripcap at the bottom, which causes the water to run directly by the slab
- Concrete surface without treatment. Observed pilling
- Insufficient vibrated concrete which has produced voids and detachments
- Lack of maintenance of concrete
- Slope insufficient outward which causes the water is stagnant



South

$P\% = >10^\circ$

Drip cap

**INTERVENTION:**

1. The steps to intervene successfully on this pathology are:

- Clean the entire surface
- check the slope. Minimum slope has to be  $10^\circ$ .

- Put formwork and concreting again

It has to be waterproof or have the top face protected by a impermeable barrier to prevent water from seeping through them.

In the vertical face encounter with the elements must have an element protection up at least 15 cm

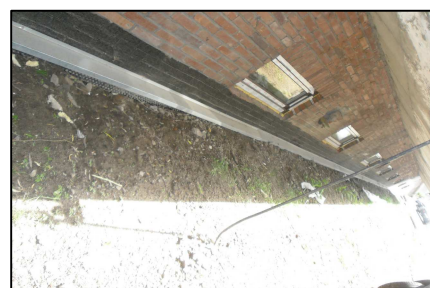
Do a drip cap on the outer edge of the lower face to prevent rainwater evacuated reaches the facade immediately inferior to it.

Expansion joints should be arranged every two pieces when they are stone or prefabricated and every 2 m when they are ceramic. The joints between the copings must be such that they are impermeable with proper sealing.



**DESCRIPTION:** Poor choice of water drainage method. placing a sink for landscaped deck with holes to evacuate water from the perforations in the sump. But when it rains the water is not drained properly and remains in the ground causing it to be wet. That moisture passes into producing more moisture facade.

## PHOTOGRAPHS:



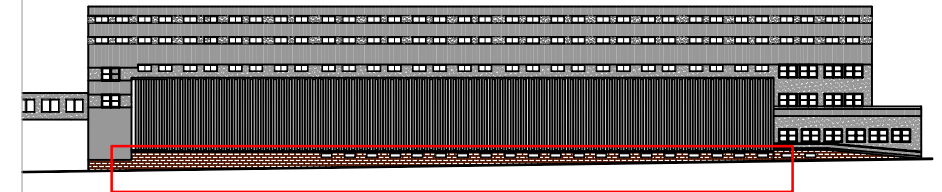
## POSSIBLE CAUSES:

- Drainage method poorly executed.
- Land obstructing water drainage

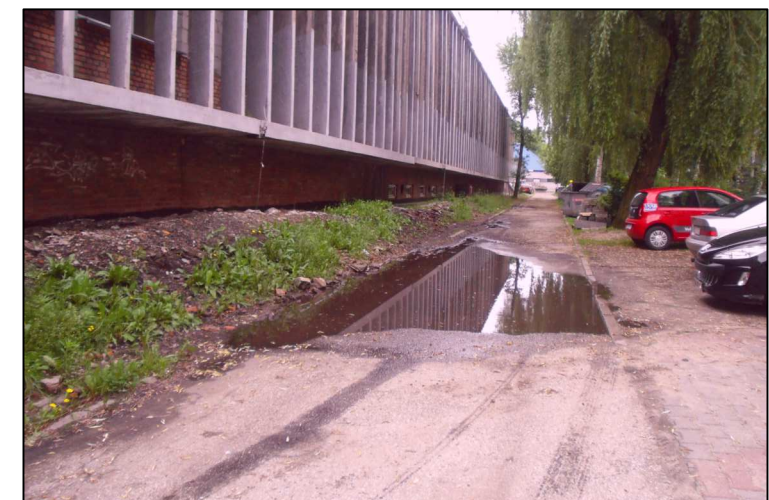
## INTERVENTION:

1. The steps to intervene successfully on this pathology are:
  - Remove all lands that are observed.
  - Change the drainage method.
  - Place a water collection gutter in the middle of the street with a slope to evacuate the water and it doesn't touch the front of the building

## LOCATION:



## PHOTOGRAPHS:



Photography of [www.arquetasprefabricadas.com](http://www.arquetasprefabricadas.com)



**DESCRIPTION:** There are lack of uniformity in rolling layer and there is a layer slip. It can be observed rust problems, disaggregation of concrete and efflorescences

## PHOTOGRAPHS:



## POSSIBLE CAUSES:

- The surface wear is produced by mechanical action due to foot traffic, ordinary vehicles, commercial vehicles and the water that carries suspended particles. Observed disaggregation of the concrete
- Small differential settlement
- Lack of maintenance of concrete
- Concrete surface without treatment. Observed pilling and oxidized armor in sight
- Abruption of concrete (coating)
- Insufficient vibrated concrete which has produced voids and detachments
- Use low strength concrete.

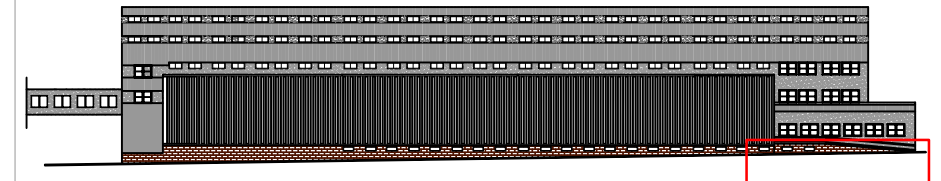
## INTERVENTION:

The steps to intervene successfully on this pathology are similar to the intervention of the pathology 7:

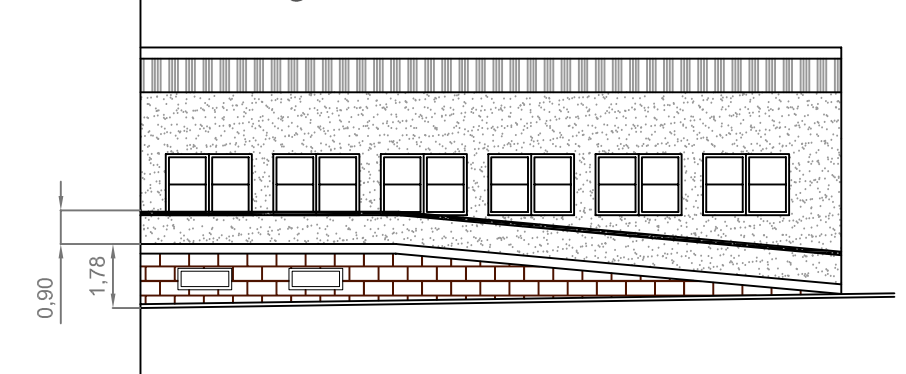
First removing layers of the ramp:

- 1- Substrate preparation: for the corrosion steel, clean it with sandblasted
  - 2- Corrosion protection for exposed reinforcement: it comes to apply a dry mortan, comprising high-grade cement, aggregate plus additives, mixed with water. It provides durable protection against corrosion
  - 3- Application of bonding layer: The cementitious Sopro Repadur mortar bonding layer
  - 4- Ensures good adhesion : Apply cementitious, fibre-reinforced. The repair mortar is applied wet-on-wet to the slurry in 1 to 5cm thick coat.
  - 5- Final surface finishing: Sopro Repadur 5 fine PCC concrete filler is used to fill pores and blowholes and to prepare substrate for paint systems or other coatings. The filler may be applied in coats up to 5 mm thick.
- Following post the whole staircase formwork
  - Return to be concreted all the ramp. The running surface on the ramps must be adherent. To avoid scuffing of the ramps will be applied, at least in the tread portion, a coating layer of concrete

## LOCATION:



The entire length of the ramp there aren't banister. Place it, with a height of 0.90m.





**DESCRIPTION:** Metal profiles that are inside the building, are oxidized.

**PHOTOGRAPHS:**



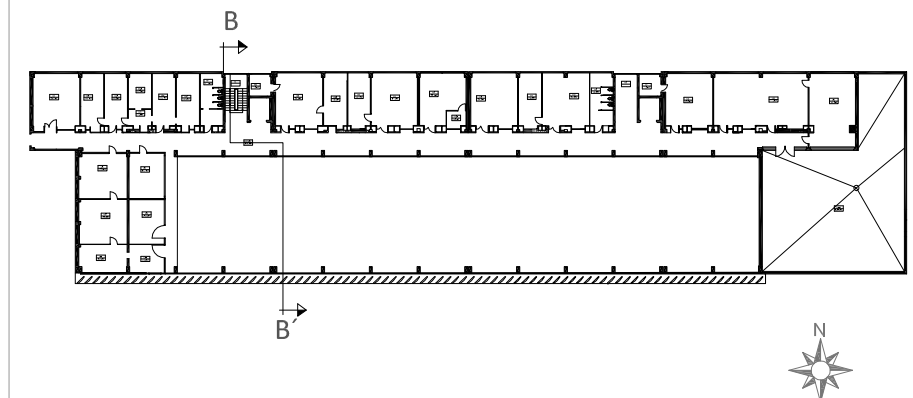
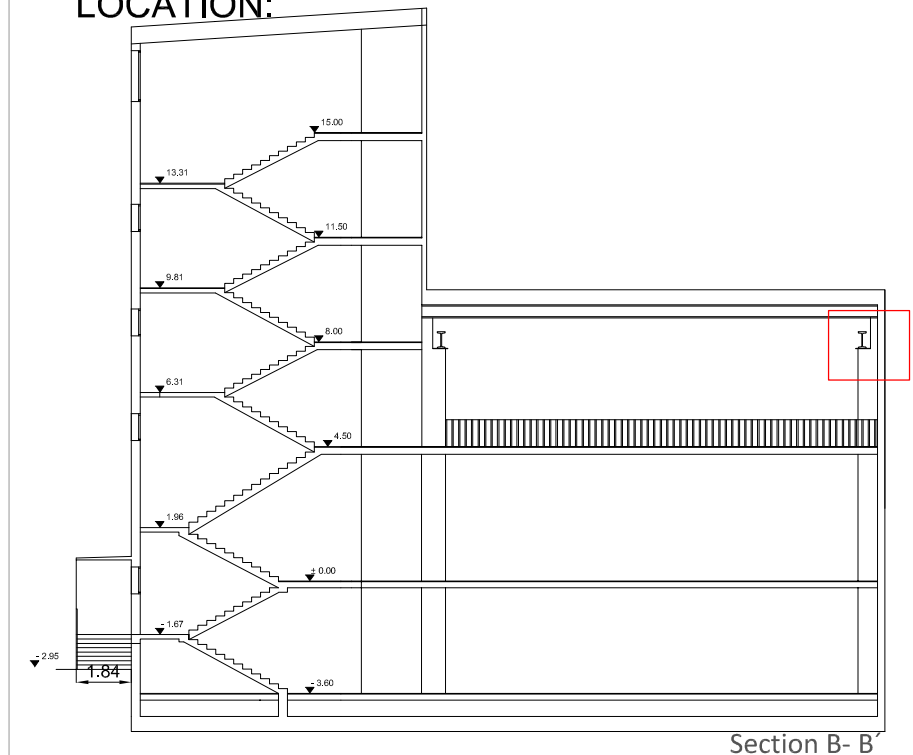
**POSSIBLE CAUSES:**

- It isn't made galvanized steel
- Because of the moisture

**INTERVENTION:**

- The steps to intervene successfully on this pathology are:
  - Perform a cleaning of the profiles by sandblasting and following do a quick drying
  - profile must be free of dust, dirt, oil, grease, oxide or other contaminants
  - passivation of the whole area: after performing cleaning steel, give a coat of epoxy to facilitate bonding with the repair material and protect the steel.
  - Protection: Cover the elements with anticorrosive coating

**LOCATION:**



**DESCRIPTION:** Fissures are observed at the beginning of the stairs.

Also breakage of parts of the steps

## PHOTOGRAPHS:



## POSSIBLE CAUSES:

- Breakage of the steps may be due to high pedestrian traffic or hard hits to the stairs
- Horizontal fissure on the stairs due to poor execution of the ladder. Maybe because of insufficient splicing of reinforcements of the slab with the ladder

## INTERVENTION:

This pathology is mild

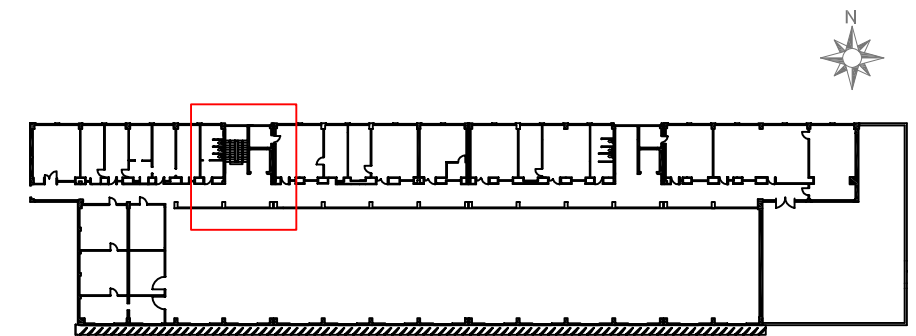
- The breakage of steps only causes aesthetic problems:

- Application of bonding layer: The cementitious Sopro Repadur mortar bonding layer
- Ensures good adhesion : Apply cementitious, fibre-reinforced. The repair mortar is applied wet-on-wet to the slurry in 1 to 5cm thick coat.
- Final surface finishing: Sopro Repadur 5 fine PCC concrete filler is used to fill pores and blowholes.

- The fissure of the stairs, still is not a crack

Recommended observe the crack for a given time and if it increases the thickness or depth and it would be a crack. We will have to take action

## LOCATION:

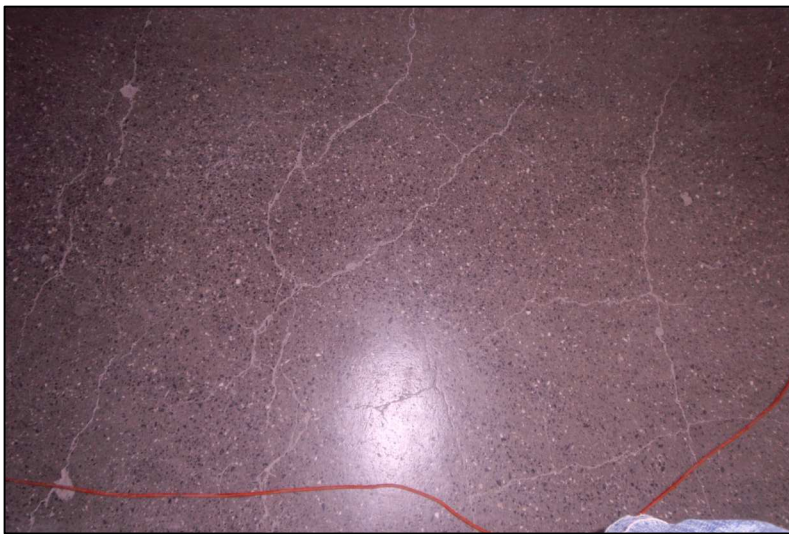


First Floor



**DESCRIPTION:** Observed fissures and cracks in different directions of the pavement. Terrazzo is positioned “in site” It isn’t made up of tiles of a given size. They are unspecified dimensions plates with joints therebetween

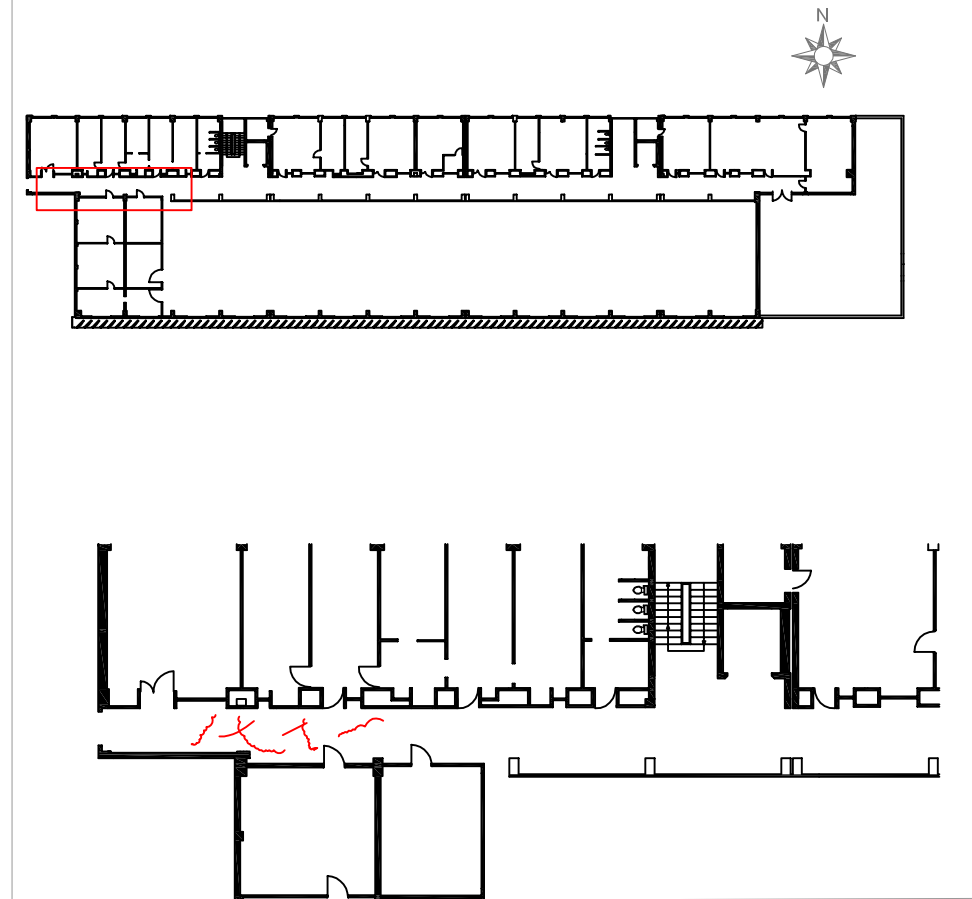
#### PHOTOGRAPHS:



#### POSSIBLE CAUSES:

- Absence of dosing mortar 1:6 that makes sharing mortar in order to distribute pressures and level the ground
- Joints insufficient or excessive plate dimensions
- Weakness of the flooring material.
- Errors in adherence with the support.
- Insufficient flexural strength of the tiles (not to be less than 150kp/cm<sup>2</sup>)
- Lack of continuity and strength of the layer.
- Uneven distribution layer.
- Mechanical erosions produced by the friction of use, since the pavement is in an area of passage and very busy.
- Linear cracks caused by tensile stresses to shrink the pavement.

#### LOCATION:



#### INTERVENTION:

At the moment is not very serious pathologies ,but if the cracks increase the best solution would be the removal of all the affected flooring and replace it by taking various precautions:

pose the possibility of placing terrazzo tiles

- Lift the entire affected and corresponding pavement layers up to the slab.
- Resume all layers.
- Placement Print impact resistant
- Placing concrete leveling for surface leveling.
- 2cm of crushed sand.
- Mortar cement terrazzo gripping.
- Placement terrazzo pavement, paying extreme care to the execution of the joints. The marble floor has to be special for high traffic.

**DESCRIPTION:** Outer wall made of brick 7. Insufficient wall thickness and the anchoring of the banister has perforated the brick and leaving a completely portion of a brick

**PHOTOGRAPHS:**



**POSSIBLE CAUSES:**

- Placement of a brick thick inadequate

**INTERVENTION:**

1. The steps to intervene successfully on this pathology are:
  - Withdraw the banister and one of this option:
    - 1- Perform the anchoring banister in a different way and repair the broken brick
    - 2- Increase the width of the wall. realizing it again with thicker brick

**LOCATION:**

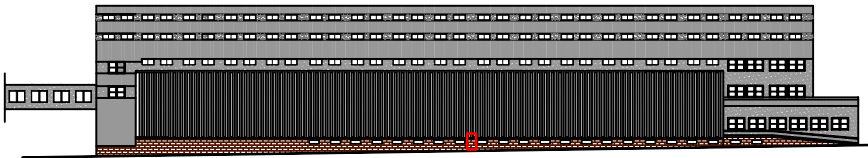


North \_\_\_\_\_



DESCRIPTION: Observed vertical crack in the exposed brick in the bottom of the façade

LOCATION:



PHOTOGRAPHS:



POSSIBLE CAUSES:

- Overloads. Unexpected overloads or higher than expected.
- Differential settlement of the foundation or ground. Minimal drop in level of a portion of the work as a consequence of compression of the material used or the area where support stabilization
- Lack of adhesion between brick and mortar
- By lack of wetting of the brick in its placement
- Vertical thrust



INTERVENTION:

The steps to intervene successfully on this pathology are: Description of the method outside (facade):

To the following repair consider the crack has not affected to the structure beyond repair. Then we have to know if this crack is stable or not.:

- 1-Place testimonials to detect if the crack is stable or not. Once satisfied that the crack is stabilized proceed to put together the two parts of the facade improving continuity.
- 2 - Clean up and peel the crack by escarpment and hammer. Following removed the stones have been broken.
- 3- Observe the size of the crack:
  - If the crack is not big: Fill a mortar without retractions slightly expansive.
  - If the crack is large: stone is placed(same type as the façade) filling with non-shrink mortar.
- 4- Finally plaister the affected area in the time to proceed to coating of all the exterior walls.

**DESCRIPTION:** On the ground floor partitions where it runs the facilities, moisture and stains are observed on the wall. The tubes that protect installations are damaged and broken. Even ducts there are sections that haven't protection. The installations clamps are rusted. On the fourth floor It can be observed a similar problem as the pipe is exposed unprotected one hand.

## PHOTOGRAPHS:



Basement



Third fourth floor

## POSSIBLE CAUSES:

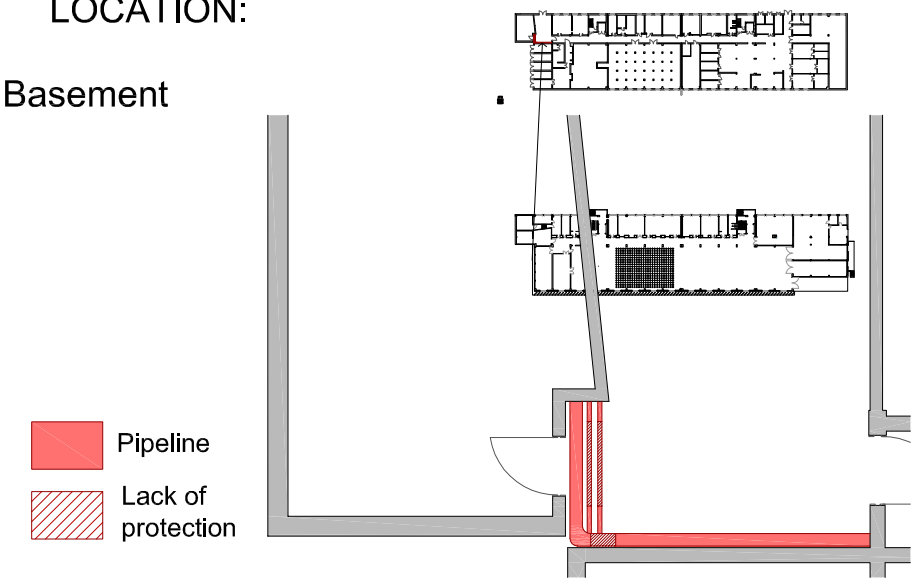
- Indoor humidity
- Leaks in water pipes
- Lack of care and maintenance
- protection tubes are unsuitable materials

## INTERVENTION:

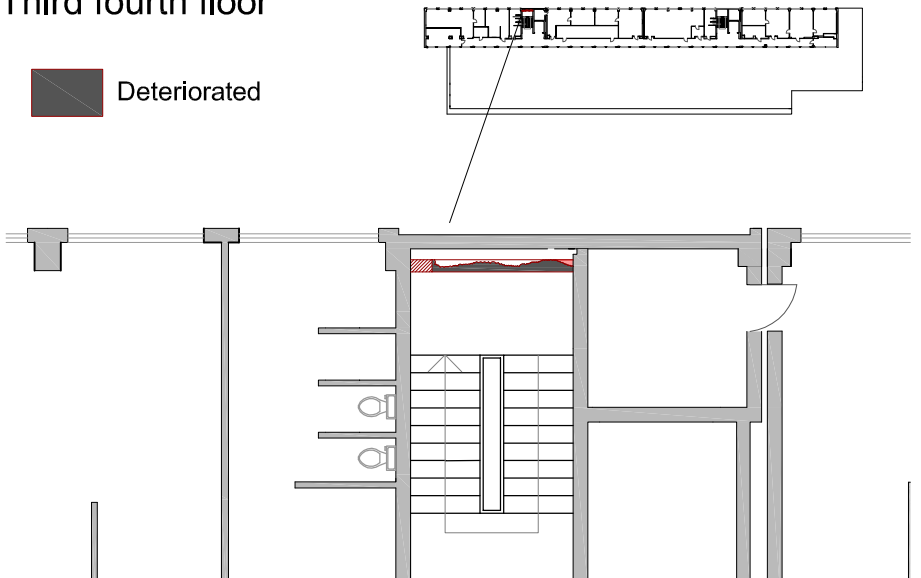
1. The steps to intervene successfully on this pathology are:
  - Check the operation of the facilities is correct by testing, to see that the stains don't come from a leak.
  - Remove the damaged parts, as well as protection tubes and clamps rusted
  - Cleaning the surface of the wall
  - Replacing tubes pipes protection of a suitable material must be insulating.

## LOCATION:

Basement



Third fourth floor



Passing ducts

- 1 - The tube feedthrough shall be arranged that between them and the ducts. This is a clearance allowing tolerances execution and possible differential movements between the wall and the duct.
- 2 -Ducts must be fixed to the wall with flexible elements.
- 3 - Should be available waterproofing between the wall and the tube feedthrough and later It must be sealed the clearance between them and the duct with an expanding profile mastic or elastic compression resistant



**DESCRIPTION:** Exit doors of the garage and technology rooms are steel. Through them excessive heating is produced, they don't present any type of insulation.

#### PHOTOGRAPHS:



#### POSSIBLE CAUSES:

- The doors do not have insulation.

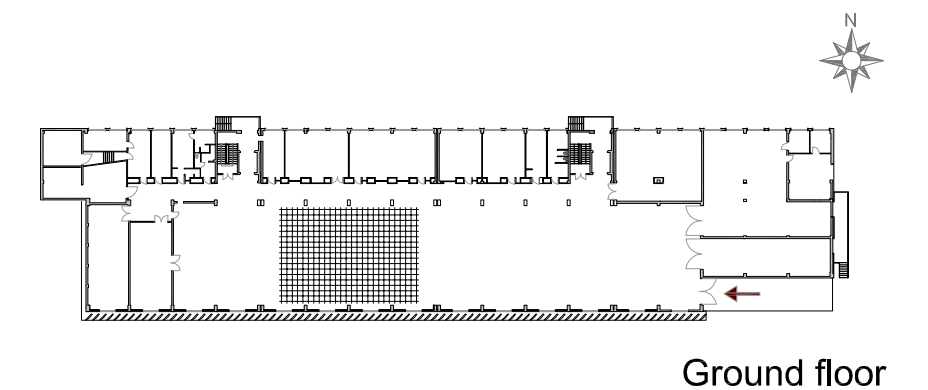
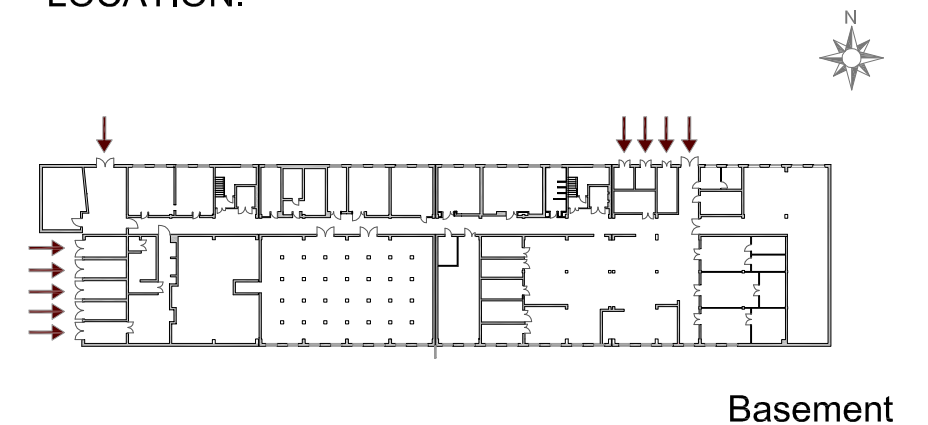
#### INTERVENTION:

1. The steps to intervene successfully on this pathology are:

- From inside placed an insulator to the entire surface of polystyrene 5cm.
- Covered with plates protected 0.75mm
- To protect the door from the outside give it an anticorrosion alkyd paint film:

Before applying the paint previous surface preparation:  
The surface must be clean, dry, free of dust, grease, soap, mushrooms before any application.

#### LOCATION:



→ Doors to put the insulation

#### THERMAL TRANSMITTANCE

Regulation:  $U = 0,90 \text{ W / m}^2 \text{ K}$

Door with polystyrene insulation 5cm  $U = 0,86 \text{ W / m}^2 \text{ K}$

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