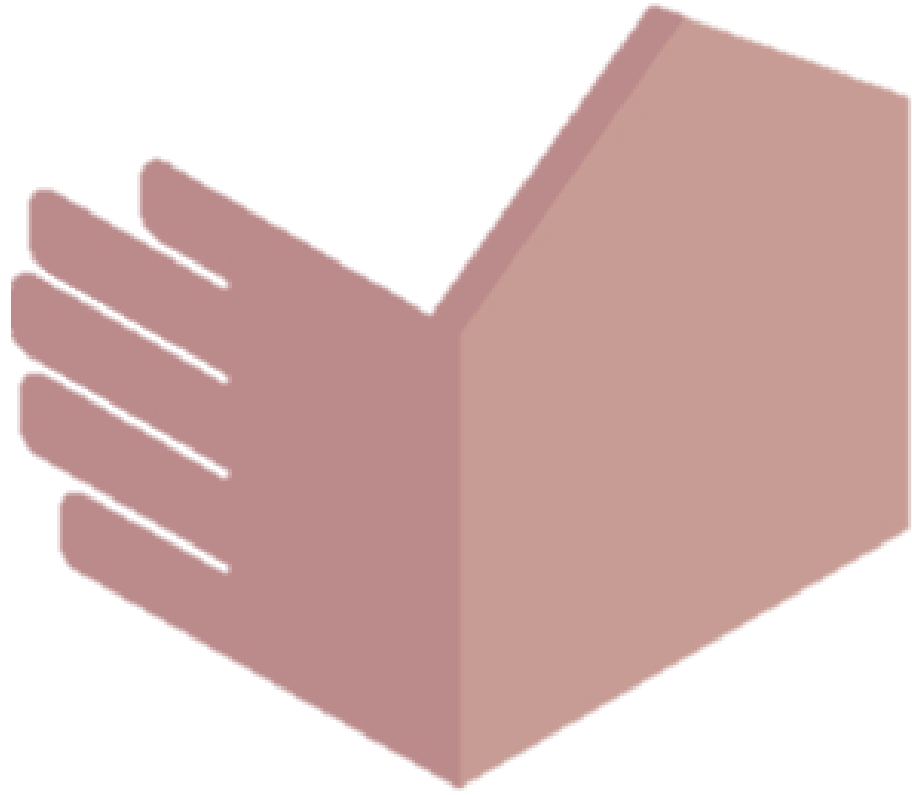




Türkiye Earthquake Light Repair Shelter Guidance

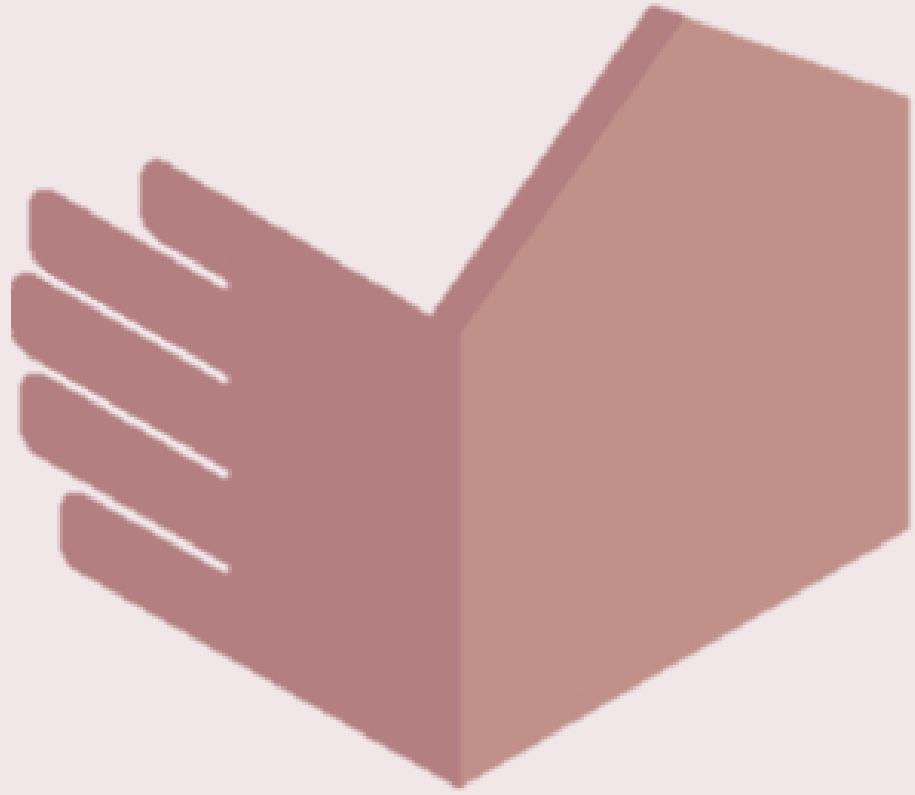


Overview

- Introduction 3
 - This chapter explains the purpose of this guidance
 - And provides visual descriptions of the activities.
- Technical Approach 7
 - Technical description of each activity
 - Types of defects and solutions
 - Method Statement of correct implementation
- Safety Measures 29
 - Protective Personal Equipment (PPE)
 - Tools and Equipment Organization
 - Waste Management

**Original presentation by Shelter Sector – Beirut Port Explosion*





INTRODUCTION



Introduction

Purpose of this presentation

Description of Activities

Is to provide the Shelter sector partners and their beneficiaries with an overview of how to properly and safely repair lightly damaged dwellings in the earthquake affected areas.

- Common technical issues faced by partners and their contractors in the field.
- Highlighting reoccurring remarks and notes witnessed by Shelter Sector partners on executed works.
- Quality of works implemented and ways to improve.
- Provide Technical explanation of application procedures.
- Unify and Unite intervention methods and approaches by all partners.
- Safety precautions to be considered and implemented.



Introduction

Purpose of this presentation

Description of Activities

The most common types of repairs needed in the EQ affected areas are:



Crack Repairs



Crack Repairs



Crack Repairs



Crack Repairs

Introduction

Purpose of this presentation

Description of Activities



Crack Repairs

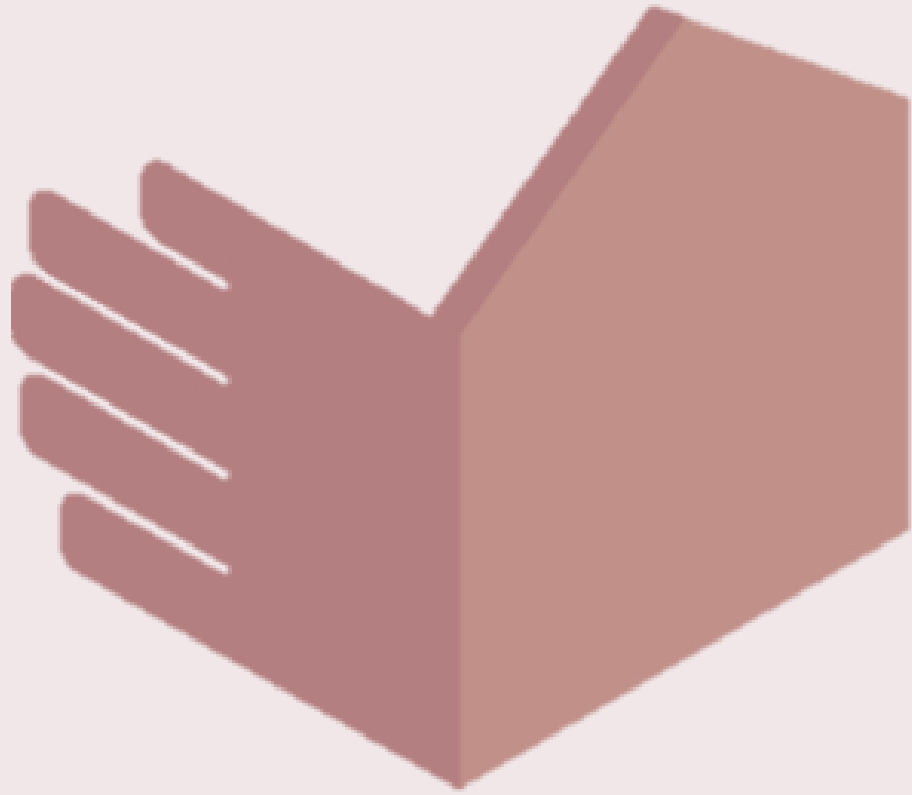


Miscellaneous

On this guidance we will be provide basic information on how to carry out each of these activities in more detail.

Technical Approach

Technical Description of Activities



Technical Approach

Crack Repairs

Plastering

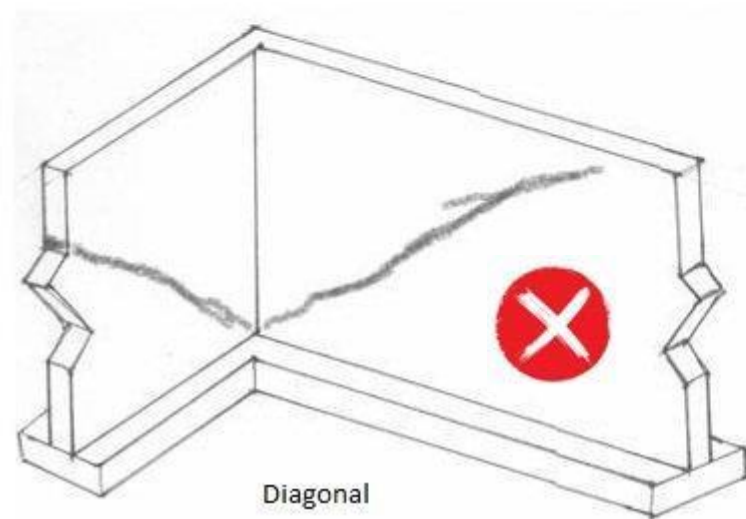
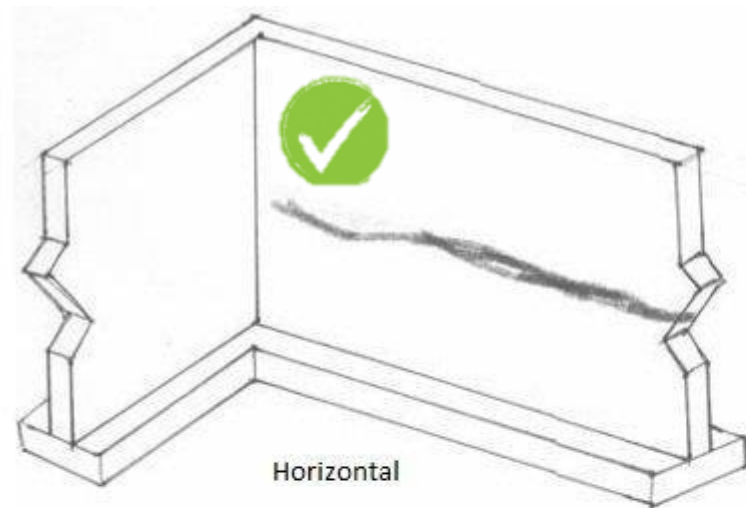
Painting

Waterproofing

Concrete Repairs

Miscellaneous

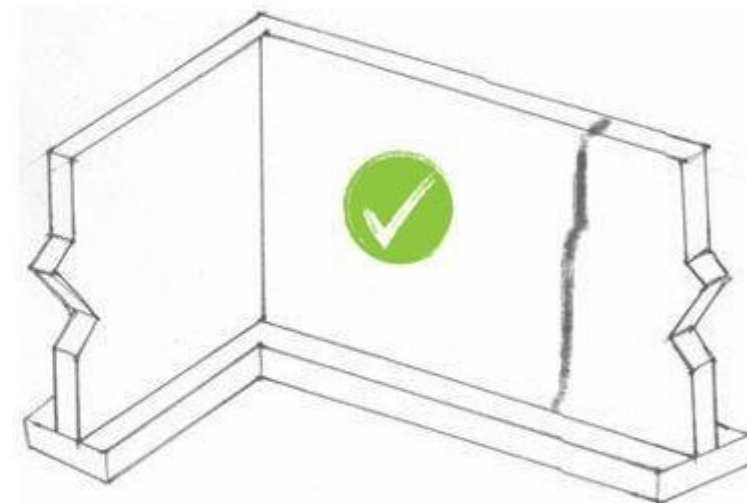
Types of Cracks:



Can be repaired



Expert advice required



Vertical

Technical Approach

Crack Repairs

Plastering

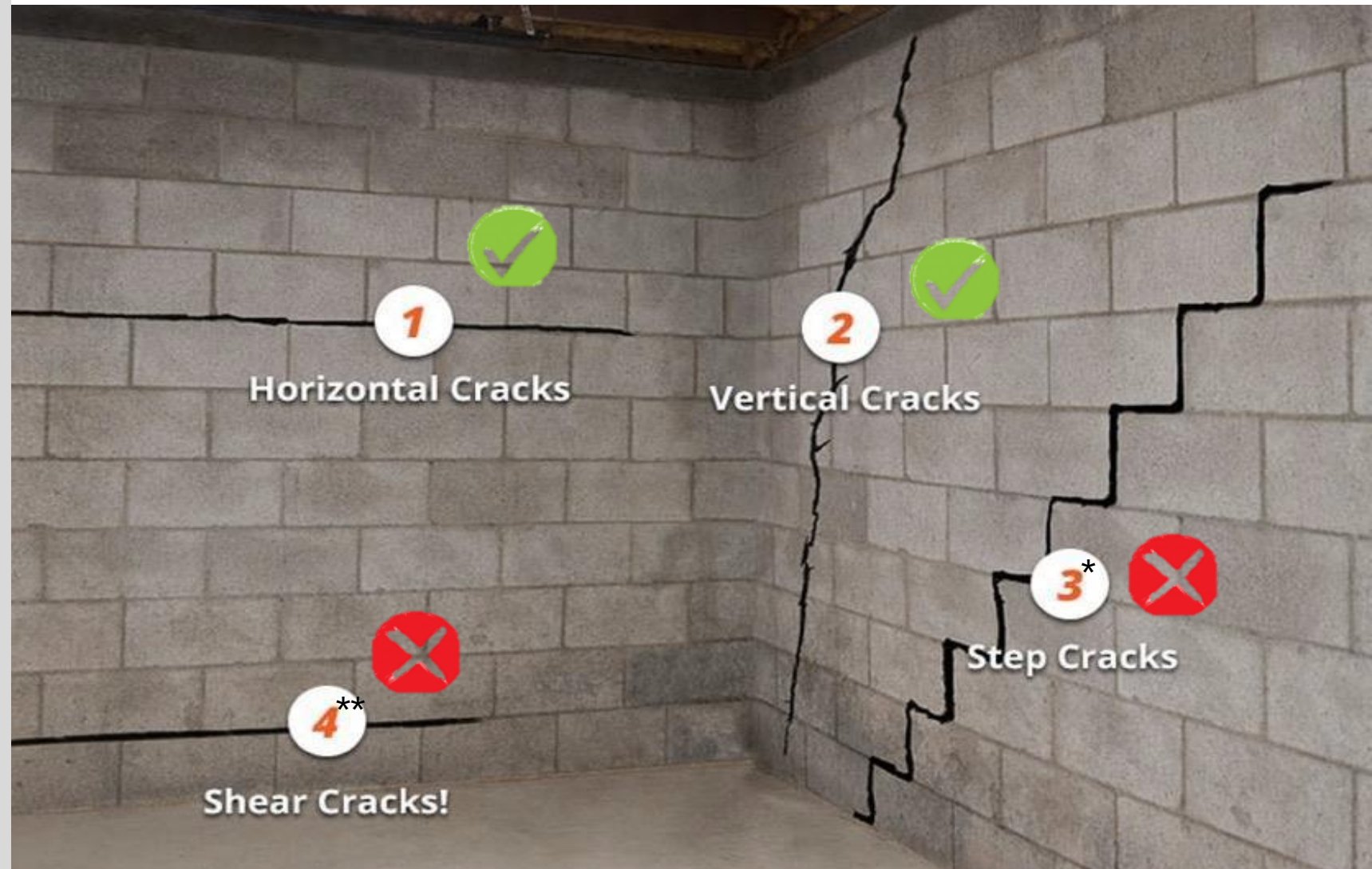
Painting

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Types of Cracks: Masonry Walls



* Also called Diagonal/X cracks.

** Shear Crack: if the horizontal crack is near the base of the wall,



Technical Approach

Crack Repairs

Plastering

Painting

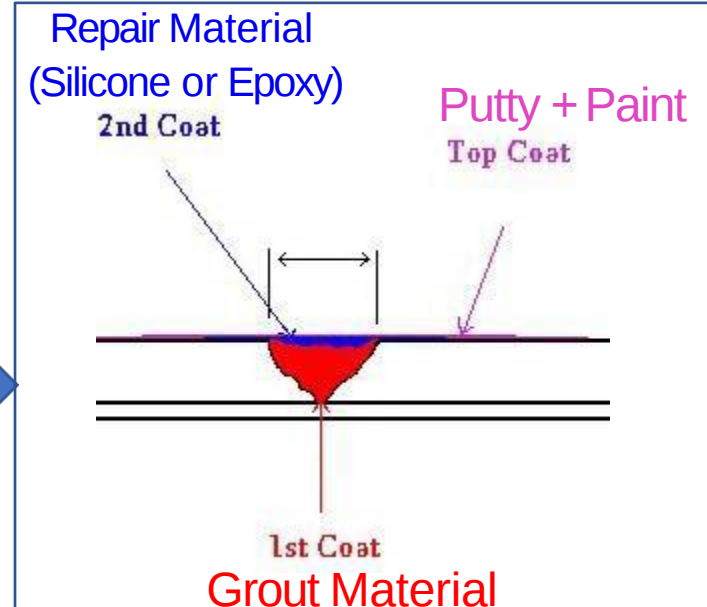
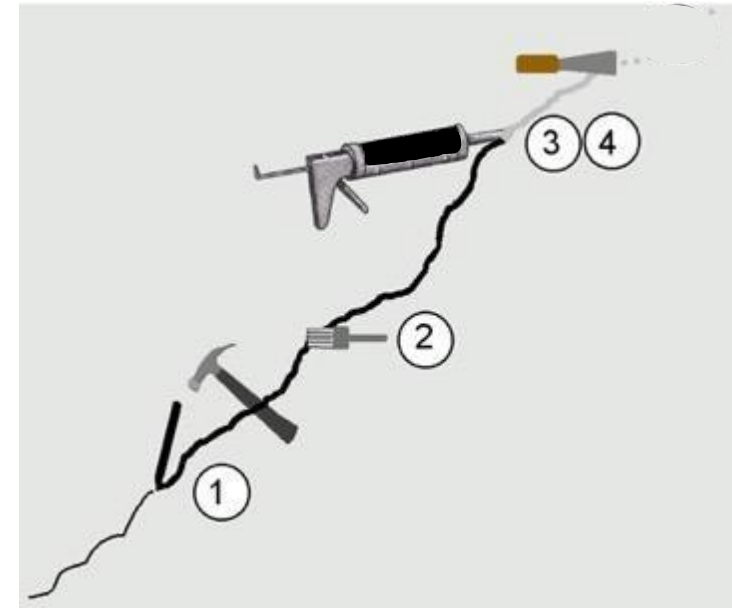
Waterproofing

Concrete Repairs

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How to perform Crack Repairs:

1. Clean the crack using hammering methods
2. Make sure the plastered area around the crack is intact and no hollowness is witnessed
3. Examine the crack:
 - a. Is the crack visible in the Concrete or Masonry underneath?
 - b. Are there any other cracks parallel to the one being repaired?
 - c. Are there any intersecting cracks?
4. Solutions:
 - a. Fill crack with epoxy or silicone depending on wall material
 - b. If crack is visible in the Concrete, expert advice is recommended before continuing.
 - c. If crack is visible in the Masonry Unit, further demolition of the crack is required using the mentioned method
 - d. If parallel or intersecting cracks are witnessed, area should be repaired completely



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Crack Repairs

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Different Types Of Cracks

All cracks are different, some are completely normal. A reliable way of assessing which cracks are concerning is by measuring their length, width and depth.

Severity	Size (Width)	Action
No Cause for concern	Hairline	No Action Particularly necessary.
Minimal	<1 mm	Easily fixed by redecorating.
Small	1mm – 5mm	Easily fixed with filler. Exterior cracks may need repointing.
Moderate	5mm – 15mm	May need professional attention.
Serious	15mm – 25mm	Often caused by structural damage. Seek expert advice.
Very Severe	>25mm	Serious structural damage. Seek expert advice.

Technical Approach

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When and How to perform Plaster Repairs:

Bulging of Plastered Walls



Before removing the plaster, we need to check the integrity of the plaster by:

1. Checking for hollow sound by hitting the wall with a metal or wood piece
2. Rinsing the wall with water to check for minor plaster cracks

Note: If possible, it is better to know what is under the plaster (Masonry wall or Concrete)

Technical Approach

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When and How to perform Plaster Repairs:

Cracked Plastered Walls



In such cases, repair of the plaster is not favored, therefore the plaster should be completely removed, and new plaster should be applied using proper tools and methods

Technical Approach

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When and How to perform Plaster Repairs:

Method Statement of Plaster Works

1. Clean the surface from dust or loose materials
2. Remove any wood particles or other media from the surface
3. Fill up all large holes or openings with mortar (NOT PLASTER)
4. Installation of plaster accessories:
 - a. Wire mesh between Masonry and Concrete elements
 - b. Angle/Corner beads in case of corner plaster works
 - c. Plaster-stop beads at open ends
5. In case of large areas to apply plaster, we should:
 - a. Provide guidelines/axis
 - b. Install dabs, such that distance between dabs is not more than 1.5m
 - c. Maximum dab distance from intrusions is 30cm (Floor, Ceiling, Walls, etc...)
6. Apply rush-coat/spatter-dash on the surface, to be left untouched and cured for minimum of 48 hours or per manufacture instructions.
7. Apply plaster on moist wall by hand toweling firmly to ensure strong grip
8. Cure the new cement plaster with water for at least 3 days, twice a day.



Technical Approach

Crack Repairs

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When and How to perform Paint Repairs:

Peeling of Paint



Causes:

- Paint was applied on dusty/dirty surface
- Aged Paint
- High levels of humidity during application of paint

Corrective Measures:

- Remove all loose Paint layers using a scraper
- Do not remove paint by hammering or scratching methods to prevent damage to the plaster layer
- Apply a new coat of putty where applicable
- Clean surface of any dust/debris prior to applying Paint
- Keep all window/doors open to allow air flow and prevent accumulation of humidity during application
- Read instructions on can before applying paint and take proper safety measures

Add Vanilla Extract to improve paint odor



1



Technical Approach

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When and How to perform Paint Repairs:

White Vinegar kills mold/algae sprouts



2



Damp and moist walls are to be treated prior to new paint application by:

1. Determining source of moisture
 - a. **Internal:** Humidity in bathrooms, kitchens, etc.
 - b. **External:** Water leaks
2. After fixing the issue, allow surface to dry completely before applying any new putty or paint layers



Technical Approach

Crack Repairs

Plastering

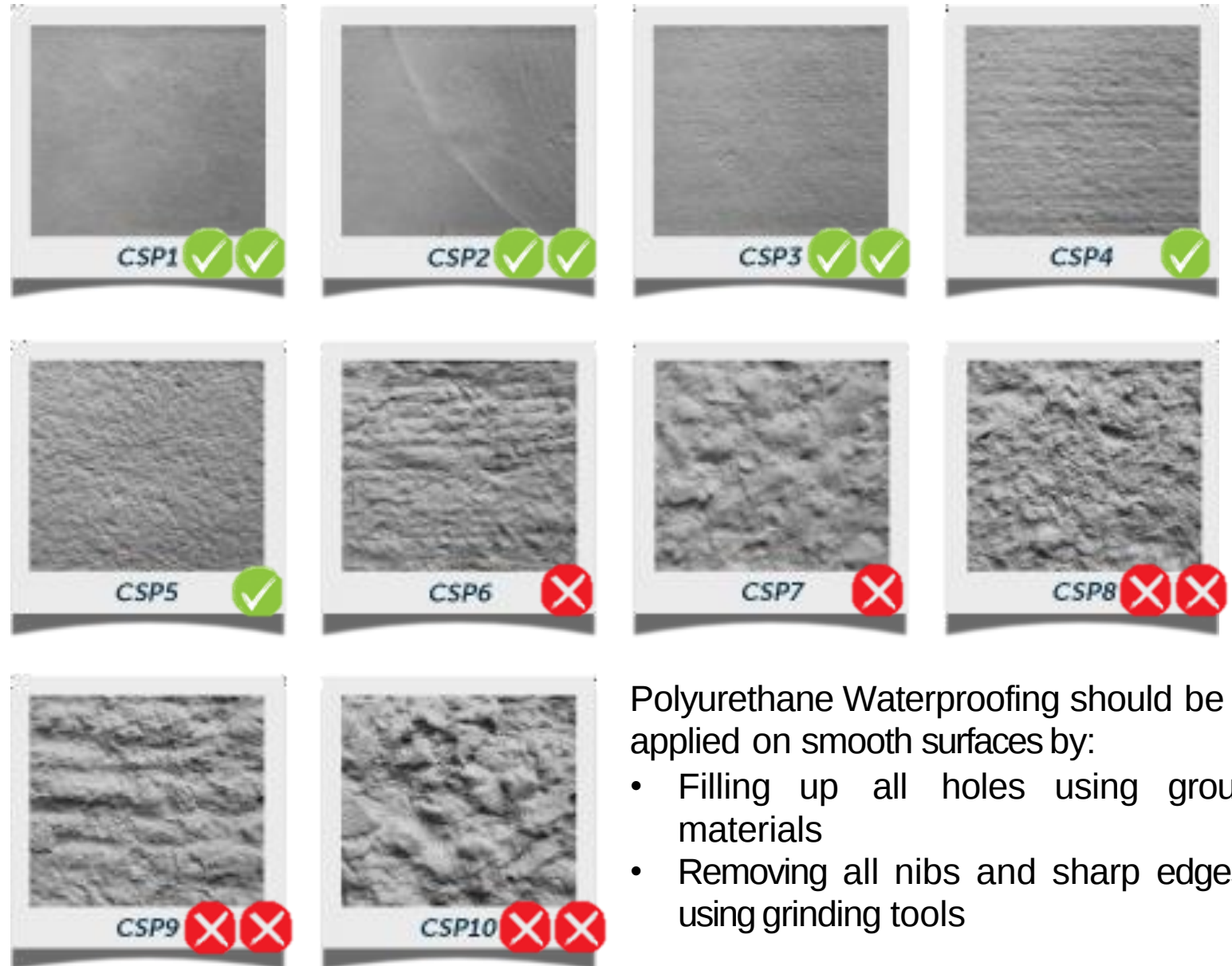
Painting

Waterproofing

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Miscellaneous

How to apply Waterproofing: Surface Preparation



Polyurethane Waterproofing should be applied on smooth surfaces by:

- Filling up all holes using grout materials
- Removing all nibs and sharp edges using grinding tools



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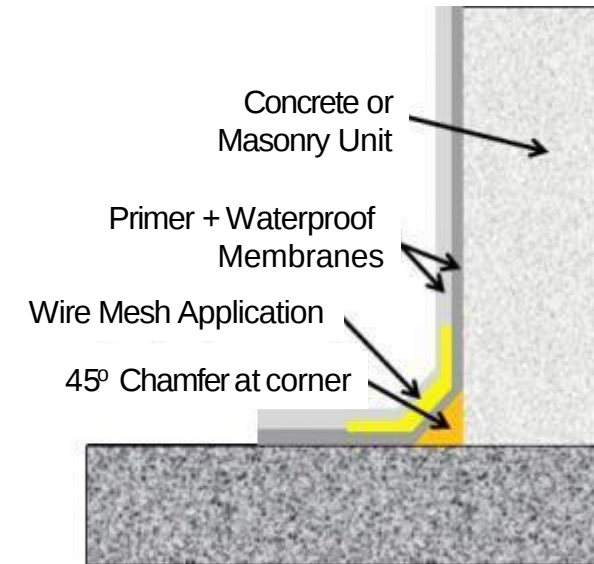
Concrete Repairs

Miscellaneous

How to apply Waterproofing: Surface Preparation (Special Conditions)

Edges and Corners

- All 90° corners are to be treated by grooves and 45° chamfers using mortar
- Any vertical element on concrete slab shall be treated accordingly (Grooves and Chamfers)
- Install wire mesh during W/P application to prevent hairline crack development between new and old concrete surfaces



Tiled Areas

- Best scenario is to remove all tiles and apply the waterproof to the concrete surface
- Due to many circumstances, the above scenario is not applicable, therefore we can do the following:
 - i. Grouting of the tiled area using smoothing compound or non-shrink grout, to fill all the tile joints and eliminate minor joint cracks
 - ii. Remove the skirting, if possible, or apply the “Edges and Corners” steps mentioned above, using non-shrink grout



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How to apply Waterproofing: Waterproofing Application

After ensuring all surface preparation conditions are met, we can start waterproofing execution:

- 1st Layer of the waterproof system is to be the Primer coat, because it acts as a bonding enhancer of the W/P membrane to the surface.
- Wire mesh installation should be implemented in parallel to the Primer coating activity
- 2nd Layer (1st coat of PU membrane) should be applied within max of 24 hours GAP to the Primer coat application, to prevent dust accumulation between the layers and/or diminishing the bonding strength of the primer
- 3rd Layer (2nd coat of PU membrane) shall be applied such that a quick inspection of the 1st layer is done to check for the following:



- ✓ Air bubbles due to bad bonding to the surface or dampness
- ✓ Minor cracks
- ✓ Any damage or defects is noticed (footprints, animal prints, etc.)
- ✓ Surface is clean and dry



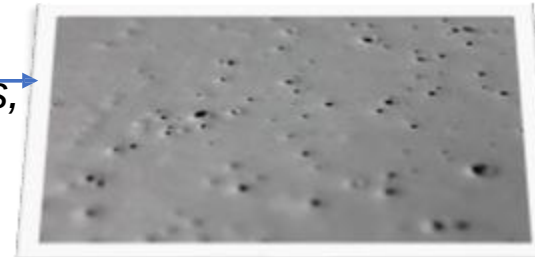
a. Applying the primer



b. Applying the 1st coat



c. Applying the 2nd coat



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How to apply Waterproofing: Waterproofing Application

After completion of the W/P application, Resin coating should be applied on all locations where different media (plastic, steel, etc.) are in contact to the PU



Point Loads

During reallocation of water tanks or other point loads on the new PU membrane, it is preferable to add a protection layer under the load using geotextile or “cartonal” to prevent any damage to the new membrane

What to avoid

- **NO** waterproofing can be applied on Masonry unit without plaster
- **NO** waterproofing can be applied on damp areas, humid and damp surfaces need to dry out completely

(DO NOT USE HEAT TO SPEED UP EVAPORATION)

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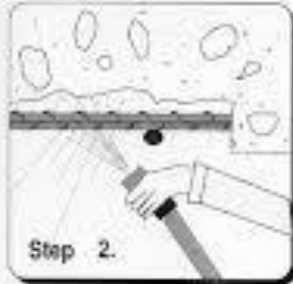
Miscellaneous

How to apply Concrete Repairs



Step 1:

- Remove all defective concrete using power tools
- Make sure remaining concrete surface is intact and not damaged



Step 2:

- Clean the area from all debris and dust particles using either of the below methods:
 - ✓ Brushing
 - ✓ Air blowing
 - ✓ Water jetting



Step 3:

- Clean defective steel reinforcement from rust accumulation using grinding tools
- If steel reinforcement is extremely corroded preferable to replace the steel bar after consultation by an expert



Step 4:

- Protective epoxy coating of the steel reinforcement prior to application of repair material is a **MUST!**

Technical Approach

Crack Repairs

Plastering

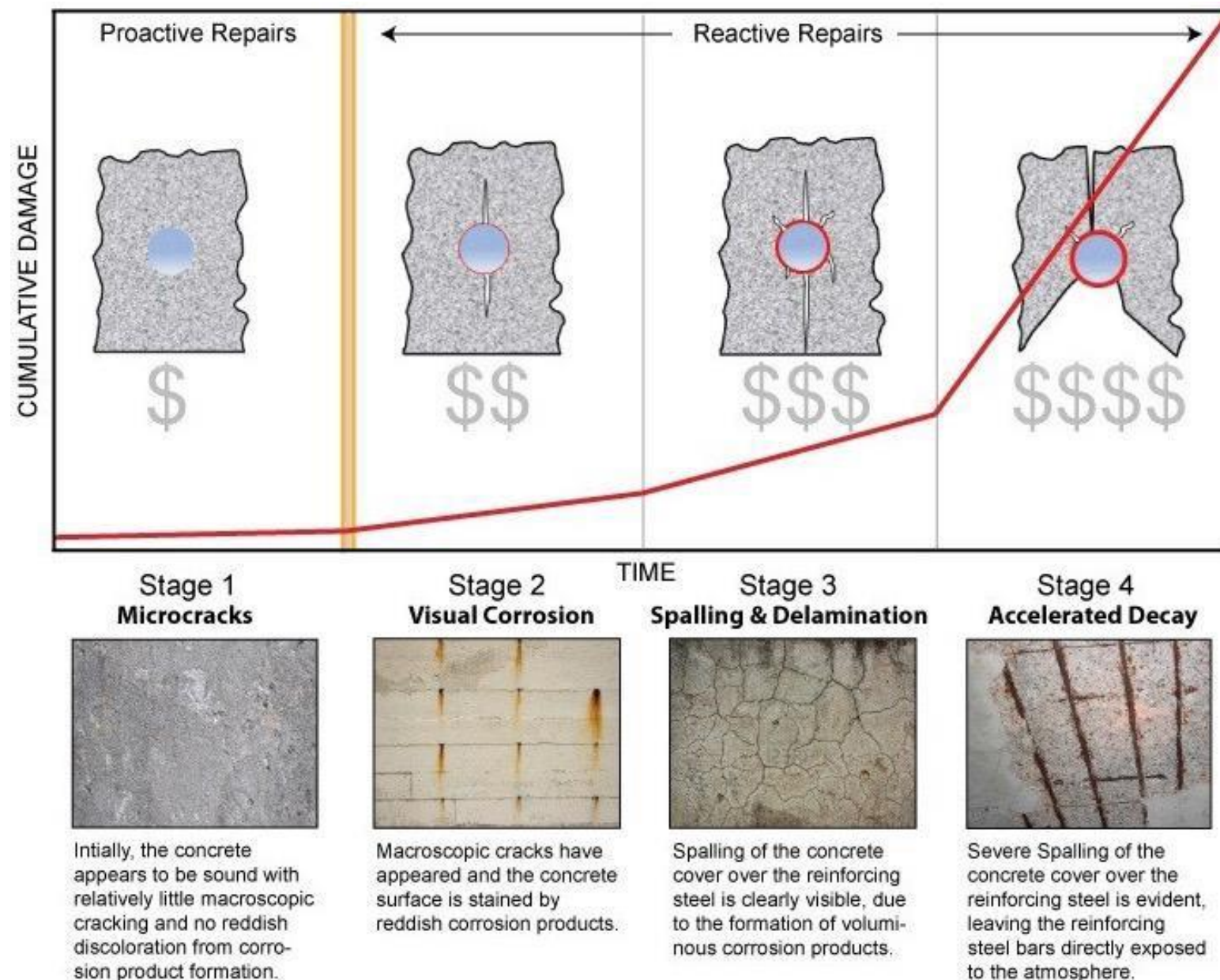
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How to apply Concrete Repairs



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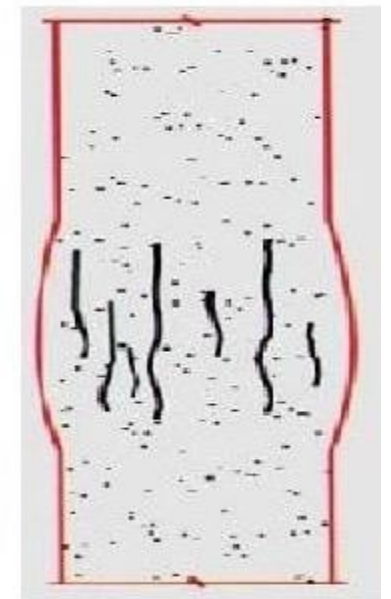
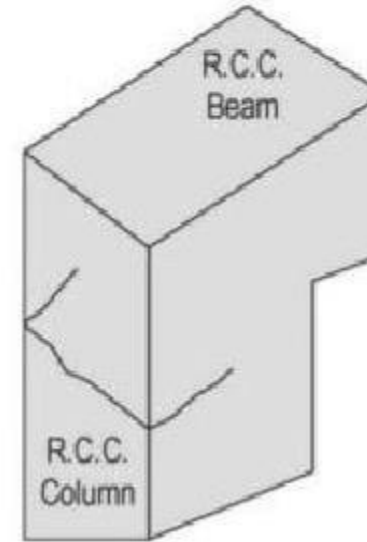
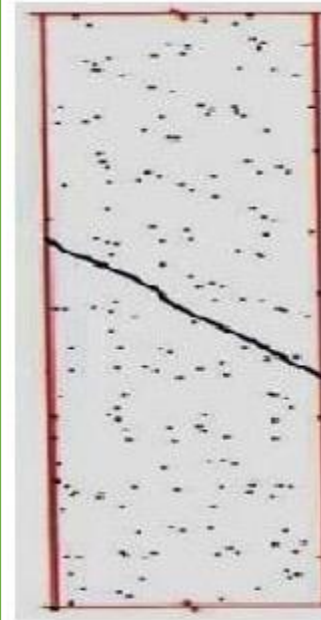
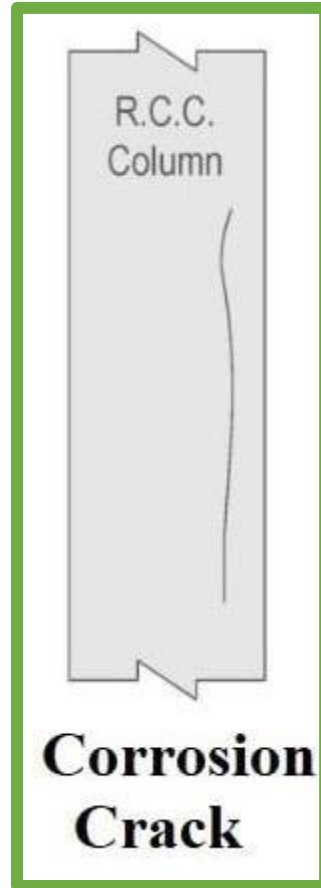
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Where to Apply Concrete Repairs



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Examples:



↑ Corrosion Crack

➡ Horizontal Crack

➡ Splitting Crack

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Where to Apply Concrete Repairs



Deterioration of Concrete



Concrete repair methods mentioned can be applied



Structural Failure



Buckling of steel

Do not repair prior to professional consultation

Technical Approach

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Common Implementation Issues Witnessed

Doors and Windows



Multiple paint layers accumulation is preventing windows/doors to close properly



Incorrect/defective installation of window



New installed threshold is preventing proper closure of door

Crack Repairs

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Common Implementation Issues Witnessed

Bathrooms



Damaged/missing tiles should be replaced after checking wall/floor underneath for cracks

Damaged pipes need assessment to find source of leaking so they can be fixed within the wall



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Common Implementation Issues Witnessed

Electrical Problems



Ceiling lighting cables are to be fixed prior to installing the cable tray

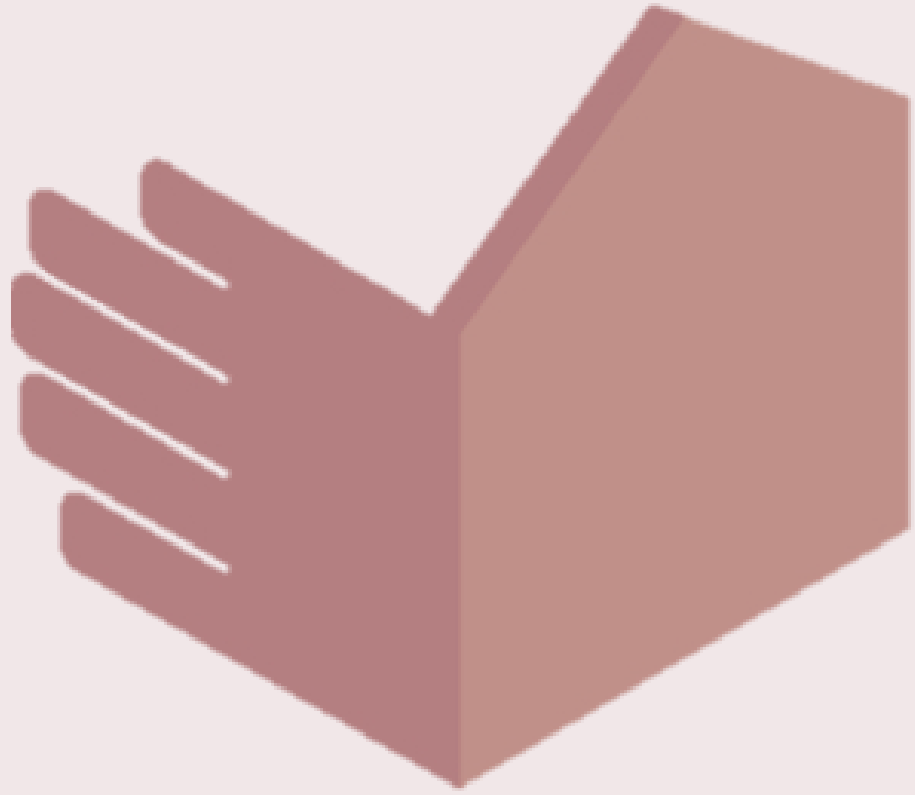
Affordable types of cable fixation clips



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Safety Measures



Safety Measures

PPE

Tools and Equipment

Waste Management



Safety Measures

PPE

Tools and Equipment

Waste Management

Personal Protective Equipment (PPE)



Safety Measures

PPE

Tools and Equipment

Waste Management

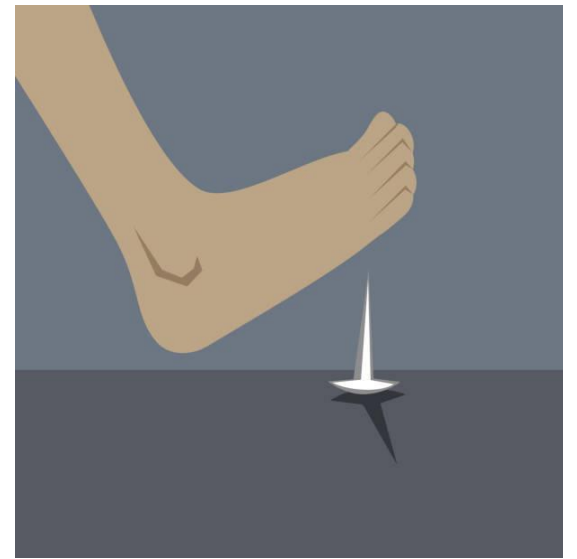
Tool and Equipment

Be sure to follow all safety instruction while using tools and materials; for example, clear the room while using paint/primer to avoid inhaling fumes

Working in an organized and tidy environment prevents any potential harm to both, the beneficiary and/or the workforce.

Types of harm include:

- Stepping on rusty nails
- Tripping and falling
- Choking hazard (children, pets, etc...)



Safety Measures

PPE

Tools and Equipment

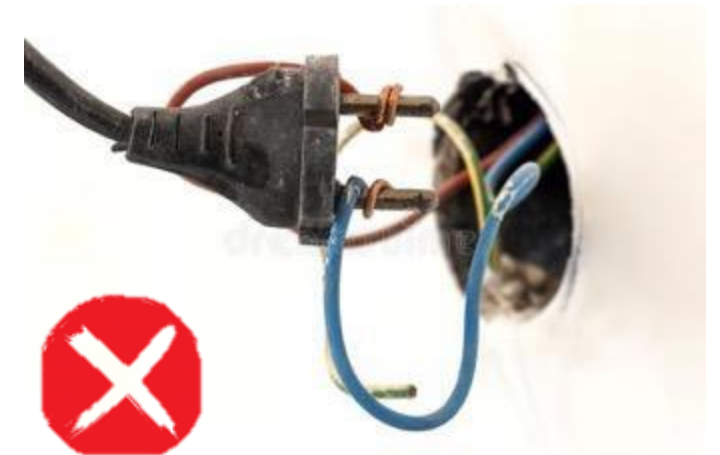
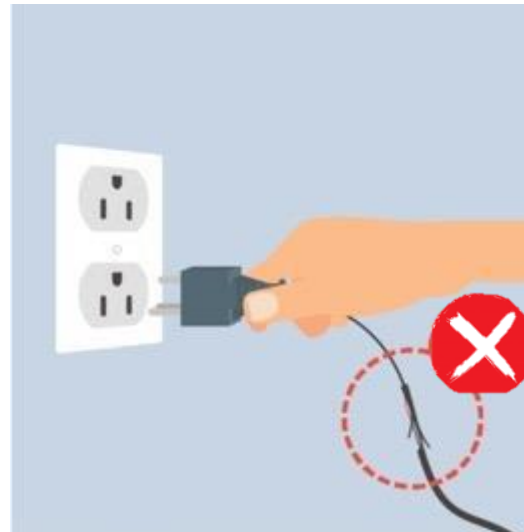
Waste Management

Tool and Equipment (Electrical)

Electrical issues are a major factor of neglected safety precautions.

We should not:

- Use damaged or defective cables
- Install sockets on wall outlets improperly
- Connect wires without taping them properly
- Keep power tools connected if not in use



Safety Measures

PPE

Tools and Equipment

Waste Management

Waste Management

- Dealing with waste produced as a result of construction activities is a challenge.
- To prevent accumulation of waste and debris one should plan for waste disposal methods
- Coordinate with municipalities to find available waste-management options
- Prevent conflicts with neighbors
- Ensure hazardous waste (like asbestos) is properly handled and disposed of



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