

**PROPOSED RENOVATION OF PGH NURSES' HOME**  
PGH Complex, Taft Avenue, Ermita, Brgy. 670, Manila City

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**TECHNICAL SPECIFICATIONS**

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SIGNED AND SEALED BY:



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# GENERAL SPECIFICATIONS



**Project:** **PROPOSED RENOVATION OF PGH NURSES' HOME**

**Location:** PGH Complex, Ermita, Manila

## **A. GENERAL CONDITIONS**

1. Under this section this paper shall be known as the standards specifications for and shall be the basis of interpretation of the plan for the proposed RENOVATION OF PGH NURSES' HOME.
2. These specifications shall be part and parcel of the attached plans hereto and shall govern over the said plans in case of conflict.

## **B. PLANS AND SPECIFICATIONS**

1. The plans and specifications shall be considered as binding in all items of work mentioned in one but mentioned or indicated in the other or vice-versa, shall be considered as there are duly mentioned in both.
2. Where no numerical indications appear on the plans, all drawings shall be carefully followed according to the plans and specifications indicated, but where numerical notations are indicated, such numerical notations shall be followed.
3. The contractor or workmen without prior approval of the architect concerned and owner or his representative shall make no change in the drawings or specifications.

## **C. CONCRETE AND MASONRY WORKS**

### **1. CONCRETE WORKS**

All concrete works shall be done in accordance with Government Specifications for Concrete and or the latest edition of the ACI requirements for Reinforced Concrete.

The following proportions shall be used unless otherwise noted in the plan:

Class "A" (1:2:4) for suspended slab, column, and beams.

Class "B" (1:2:5) for footings and foundations.

Class "C" (1:3:6) for all slab on fill.

All slab not less than 0.10 m in thickness. All slab reinforcement shall be 0.10m in thickness. All slab reinforcement shall be 0.02 m. clear from the bottom and 0.015m clear from the top of the slab.

### **2. MASONRY WORKS**

For all exterior walls use 6" concrete hollow blocks locally manufactured. All 6" hollow blocks shall be reinforced with 10 mm diameter vertical bars at every 0.60m and 10mm diameter horizontal bars at every 0.60m. All 4" hollow blocks shall be reinforced with 10 mm diameter vertical bars at every 0.60 m and 10 mm. diameter horizontal bars at every 0.60 m.

# GENERAL SPECIFICATIONS

All cells and joints for reinforcements shall be filled with mortar. All cells and joints under the ground shall be filled

For mortar and plastering, the proportion 1:3 shall be used for cement and sand mixture.

## 3. MATERIALS

- i. Cement shall conform to ASTM standards. Use only one brand for the whole structural and masonry works.
- ii. Fine aggregates for concrete, mortar, grout, or plaster: stone screenings or other materials with similar characteristics: clean, hard, strong, durable, free from dusts, lumps soft or flaky particles, shale, alkali, loam or clay.
- iii. Coarse Aggregates: Gravel should be well- drained, clean and washed.
- iv. Steel reinforcements:

Structural Grade Steel: with minimum  $F_y = 227.37 \text{ MPa}$  (3300 Psi)

Intermediate Grade Steel: with minimum  $F_y = 275.8 \text{ MPa}$  (4000 psi)

- v. Tie wires: Ga. 16 galvanized iron (G.I.) at joints or laps of placed reinforcements as indicated in the plans. Refer to structural plans and general construction notes to conform the above values. Use steel conforming to ASTM standards, deformed, for concrete and masonry requirements.
- vi. Water: Potable, free from injurious amount of oil, acids, alkali, organic materials and other deleterious substances.

## 4. FORMWORKS

Construct all formwork complete with centering coarse molds conform to shape, form line grade, maintain rigid to prevent deformation under 1 load. Provide necessary camber.

## 5. PROPORTIONING, MIXING AND CURVING

The design was based on a 3,000 lbs. concrete. Design mix proportion to produce 3,000 lbs. strength after 28 days. Proportion volume of 2 cu. Ft. boxes. Immediately after placing, protect concrete surface not covered by form from loss of surface moisture for at least 5 days. Protect from loss of water by covering with paper.

## 6. SLABS

- i. All slabs reinforcement to be 0.02 meters clear from the bottom and 0.15 meters clear from the top of the slab.
- ii. Bend bars at 30 degrees angle.
- iii. Use #3 dia. temperature bar.
- iv. Spaced 12" o.c. both ways.

## 7. CEMENT FINISHES

All concrete surfaces including those indicated as cement finish, other than floors and steps and surfaces where other applied finish is required shall be given a finish done and applied in the following manner:

- i. Immediately after removal of forms, all projecting wire and bolts and other devices used for tying forms shall be cut-off at least one-half cm. beneath the finish surface. All holes, voids, depressions, and other defects shall be



thoroughly wetted and then painted up solid with cement mortar putty of the same proportion as the mortar in the bodywork.

### 8. CONCRETE HOLLOW BLOCKS

Concrete hollow blocks are indicated in the drawings shall be jackbilt or equivalent. The normal thickness of the blocks shall be 6" and 4" required. Concrete blocks shall be wetted thoroughly with water prior to laying. Blocks shall be laid in running hand with vertical faces truly vertical with clean out joints. Partitions shall be reinforced with 3/8" dia. horizontal @ 24 o.c. and 1/2" dia. vertical @ 12 o.c. The cell containing the vertical reinforcement shall be filled with cement mortar of 1:3 mixture.

## D. CARPENTRY AND WOOD WORKS

1. Lumber shall be of approved quality of their respective kinds required for the various parts of the work; they shall well-seasoned thoroughly dry and free from all imperfections impairing their strength, durability or appearance. Form lumber shall be rough smoothly dressed and well sandpapered.
2. All frames shall be done as far as possible with carefully fitted joints. All doors, windows and other openings were so indicated on plane, shall have frame and sill of the dimensions shown and all frames coming in contact with concrete shall be anchored with 20 D nails.
3. DOORS
  - i. For the restoration of wooden doors and jambs, refer to Section E. Restoration Works and Conservation Procedures.
4. WINDOWS
  - i. For the restoration of wooden windows and frames, refer to Section E. Restoration Works and Conservation Procedures.
5. VARNISHING
  - i. All woodwork to be varnished must first be thoroughly sandpapered and all crack holes, and other defects must be thoroughly and carefully filled with the first quality colored or white putty tinted to match the desired finish.
  - ii. No man-on-the-job wood filler will be allowed. It should be a first quality wood filler.
  - iii. Before varnishing a sample must be applied for approval of the owner.

## E. RESTORATION WORKS AND CONSERVATION PROCEDURES

### 1. PAINTING EXTERIOR STUCCO

- i. Make sure all stucco repairs have been made and the surfaces to be painted are sound and dry.
- ii. Using scrapers and stiff bristle brushes, remove any loose, flaking paint.
- iii. To remove any old chalking paint:
  - a) Wash surfaces with a non-ionic detergent using low pressure water (80-100 psi) or a garden hose.
    - o a. If mildew is a problem, add bleach to the detergent.  
*Note: do not use detergent containing ammonia.*
  - b) Thoroughly rinse the surface with clean, clear water and allow to dry.
- iv. If recommended by the paint manufacturer, apply a masonry conditioner/sealer which has been thinned if necessary according to manufacturer's instructions:
  - a) Apply using brush, roller, or spray, only as much as surface will absorb.  
*Note: do not allow a visible glaze to appear on the surface of the stucco. Do not apply to a damp surface because the glaze will not sufficiently penetrate a damp surface.*
  - b) Allow to dry as per manufacturer's instructions.
- v. Scrape or brush off all loose paint. Spot prime before reapplying paint.
- vi. Follow manufacturer's instructions when selecting and applying paint.
  - a) Use a brush or roller to apply two coats of paint to ensure complete coverage. Spray equipment may also be used.  
*Note: some paint manufacturers do not recommend roller application. Consult manufacturer's directions for proper application methods.*
  - b) Allow adequate drying times between each coat of paint.  
*Note: for optimal results when using acrylic latex paints, maintain a temperature of 50 degrees fahrenheit for at least the first 24 hours after application.*
- vii. If using oil/alkyd paint, any new patches must be allowed to cure for at least a year before painting, unless a masonry conditioner/sealer has been used. Apply two top coats, using a brush for complete coverage.

### 2. DEMOLITION OF SELECTED MASONRY MATERIALS

This procedure includes guidelines to follow for the selective removal and subsequent disposal of selected masonry materials.

- i. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file photographs with Owner's Representative prior to starting work.
- ii. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

- iii. Cover and protect furniture, equipment, and fixtures from dirt or damage when demolition work is performed in areas where such items have not been removed.
- iv. Erect and maintain dust-proof partitions and closures as required to prevent the spread of dust or fumes to occupied portions of the building.
- v. Provide weatherproof closures for exterior openings resulting from demolition work.
- vi. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
- vii. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building.
- viii. Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from damage due to selective demolition work.
- ix. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of building.
- x. Erect temporary covered passageways as required by authorities having jurisdiction.
- xi. Protect floors with suitable coverings when necessary.
- xii. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
- xiii. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
- xiv. Perform selective demolition work in a systematic manner.
- xv. Use such methods as required to complete work indicated in accordance with demolition schedule and governing regulations.
- xvi. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-drawn impact tools.
- xvii. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
- xviii. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- xix. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.
- xx. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saws where possible.
- xxi. Do not cut structural steel except as specifically detailed.
- xxii. Refer to the drawings for demolition work requiring detailed sequenced procedure to protect remaining construction.

### 3. REMOVING SURFACE DIRT FROM CONCRETE



## i. Protection:

- a) Provide adequate wash solutions (i.e. water, soap and towels) before starting the job
- b) Whenever acid is used, the surface should be thoroughly rinsed with water as soon as its action has been adequate. Otherwise it will continue etching the concrete even though the stain is gone.

*Note: do not try more than one treatment on a given area unless the chemicals used from prior treatment have been washed away.*

## ii. Execution:

- a) Brush affected area with water and strong detergent.
- b) Rinse the area thoroughly with clean, clear water and blot the surface dry with clean towels.
- c) Repeat the treatment as necessary until the desired level of cleanliness is achieved.

-OR-

- d) Mix 1 part hydrochloric acid in 19 parts water.
- e) Scrub the concrete surface with this solution.  
*Note: this is a strong method and may roughen the concrete.*
- f) Rinse the area thoroughly with clean, clear water, blot the surface dry with clean towels.
- g) Repeat the treatment as necessary until the desired level of cleanliness is achieved.

-OR-

- h) Steam cleaning is generally effective and may be used in combination with proprietary materials, such as detergents for dirt removal.
- i) If there is oil present in the dirt, follow the procedure described for removing lubricating oil.

## 4. PATCHING SPALLED CONCRETE

### i. Protection:

- a) Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
- b) Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.
- c) Contractor shall test those areaway drains, window well drains, etc., which will be used to assure that drains are functioning properly prior to performing masonry restoration operations in those areas. The Contractor shall report immediately to the Construction Engineer the location of drains which are found to be stopped up or blocked.
- d) Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.

- e) Protect sills, ledges, windows, and projections from patching material droppings.
  - ii. Execution:
    - a) Remove deteriorated concrete at spalls to sound material. Grind, chisel or saw cut 1" deep undercut around perimeter of patch. Clean with compressed air. Thoroughly remove any concrete showing traces of oils or grease.
    - b) Thoroughly wet patched area prior to casting concrete patching material. If cement patching material manufacturer recommends a different procedure, such procedure is to be followed and executed in accordance with published instructions and in accordance with approved test patch.
    - c) Install cement patching material in strict accordance with manufacturers published instructions.
    - d) Finish surface to match surface being patched, by grinding, troweling, sacking, or brushing.
    - e) After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiwnylon or bristle brushes and clean water, spray applied at low pressure.
    - f) Use of metal scrapers or brushes will not be permitted.
    - g) Use of acid or alkali cleaning agents will not be permitted.
5. REPAIRING CRACKS IN CONCRETE BY INJECTING EPOXY RESIN
- i. Examine the nature and severity of the crack:
    - a) Note directions and widest point of cracks.
    - b) Note sloped floors, bulging walls and doors that do not fit.
  - ii. Determine the probable cause of cracks:
    - a) Foundation erosion.
    - b) Decay of materials.
    - c) Structural failure.
    - d) Change in materials or geometry.
    - e) Thermal and moisture changes.
  - iii. Determine possible consequences if cracks are left unrepaired.
  - iv. Evaluate alternative methods of repair.
  - v. For cracks associated with thermal movement, look for:
    - a) Horizontal or diagonal cracks near the ground at piers in long walls, due to horizontal shearing stresses between the upper wall and the wall where it enters the ground.
    - b) Vertical cracks near the ends of walls.
    - c) Vertical cracks near the top and ends of the facade.
    - d) Cracks around stone sills or lintel, due to expansion of the masonry against both ends of the tight fitting stone piece that cannot be compressed.
  - vi. Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.



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- vii. Surfaces adjacent to joints or other areas of application shall be cleaned of dirt, dust, grease, oil or other foreign matter detrimental to bond of epoxy injection surface seal system.
  - viii. Entry ports shall be provided along the crack at intervals of not less than the thickness of the concrete member at that location.
  - ix. Surface seal material shall be applied to the face of the crack or end. For through cracks, surface seal shall be applied to both faces.
  - x. Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.
  - xi. Execution:
    - a) If the crack is still damp when repairs are going to be made, be sure to use an epoxy appropriate for damp conditions.
    - b) Seal both sides of cracks with an epoxy mortar or oil-free clay, leaving small holes through which epoxy resin will be injected. 1/8" to 1/4" diameter tubing can be used to form holes. Holes should be 2"-4" long and roughly 8" apart.
    - c) Inject two-component epoxy using device as provided by manufacturer.
    - d) Injection of epoxy adhesive shall begin at lower entry port and continue until there is an appearance of epoxy adhesive at the next entry port adjacent to the entry port being pumped.
    - e) When epoxy adhesive travel is indicated by appearance at the adjacent port, injection shall be discontinued on the entry port being pumped, and epoxy injection shall be transferred to next adjacent port where epoxy adhesive has appeared.
    - f) Perform epoxy adhesive injection continuously until cracks are completely filled.
    - g) If port-to-port travel of epoxy adhesive is not indicated, the work shall be stopped immediately and the engineer notified.
    - h) When cracks or joints are completely filled, epoxy adhesive shall be cured for sufficient time to allow removal of injection or port sealing devices. The outermost quarter inch of the crack shall be filled with a colored epoxy material of the installers' choice subject to prior approval of the Architect. The colored epoxy filler shall match the existing material which it is filling and shall not be discernible from a distance of 15 feet.
  - xii. Upon completion of work, remove all seal material and other residue from site. Remove and clean exposed surfaces of residue or staining resulting from this work.
6. REMOVING PAINT FROM WROUGHT, CAST IRON AND STEEL USING ABRASIVE METHODS
- i. Before beginning work, all sources of excess moisture shall be identified and repaired as required.
  - ii. Execute test samples of the cleaning methods specified in this procedure to determine which method(s) are to be used. Sample areas shall be selected and

shall include at least one ornamental area and one flat area, or as necessary to include all surfaces types likely to be encountered in this work.

iii. Method(s) used in the actual cleaning shall be the one(s) which provide the necessary level of cleanliness with the least amount of surface alteration.

iv. Protection:

- a) Protect adjacent surfaces, including grass, shrubs and trees with paper, drop cloths and other means. Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations. All methods of enclosure and protection should be approved by the supervisor.
- b) Work area shall be sealed to prevent the spread of dust, debris and water beyond the work site, and to assist in the collection of contaminants.
- c) Provide protection boards to vulnerable decorative work and maintain for the duration of operations.
- d) All waste material is considered hazardous material and shall be collected and properly disposed of at the end of each work day.
- e) After each days paint removal work is complete, area shall be vacuumed with machines equipped with HEPA (High Efficiency Particulate Air) filters to insure all lead dust has been removed.

v. Execution:

*Note: All methods require the removal of rust to achieve a clean surface before beginning the application of final coating. As soon as the cleaned surface is dry and clear of any particles or dirt, one must promptly apply an appropriate base coating to inhibit further corrosion from setting in before moving on to the finish coatings.*

- a) Removing paint from small pieces that can be detached from structure.

*Remove only as much paint and rust each day as can be primed that same day. Bare iron and steel will begin to rust again within a matter of hours. It should not be allowed to sit unprotected overnight.*

- o Soak in a solution of hot water and TSP or sudsy ammonia to loosen the paints.
- o Remove paint with scrapers and/or a wire brush.
- o Wipe with mineral spirits to remove final traces of paint.
- o Dry immediately and prime to prevent rusting. A heat gun, set at the lowest temperature, may be used to hasten the drying time.

*Caution: do not use high heat as this may distort the metal members.*

- b) Mechanical/Abrasive Rust/Paint Removal:

- o To determine the degree of deterioration and the level of paint removal required, clear away all dust and debris followed by rub-down with mineral spirits.
- o To remove light rust and flaking, peeling paint:
  - i. Begin with emery paper or aluminum oxide sandpaper.



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- ii. Use scrapers to get under loose paint and into crevices.
  - iii. Use a wire brush, or an electric drill with a special wire brush or rotary sandpaper whip attachment if above two methods do not remove paint.
- c) Air-Abrasive Paint Removal.
- d) Air-abrasive cleaning (commonly known as sandblasting) is destructive for softer building materials. However, iron, as a hard material with a natural uneven surface, will not be noticeably damaged by its careful use.
  - o Caution: do not use air-abrasive cleaning methods in the following situations:
    - i. On thin sections or fine, intricate details of wrought iron features.
    - ii. On zinc and galvanized iron and steel.
    - iii. On features for which the original surface texture is an integral part of the design (air-abrasive cleaning will alter original surface texture and appearance).
    - iv. On stainless steel features.
  - o Air pressures at the compressor shall be between 40 psi to 70 psi.
  - o Grit size shall be in the range of #10 to #45 (copper should not be used as it will cause an electrolytic reaction). Other abrasives, such as organically based grit such as ground walnut shells, or other abrasive methods such as glass bead peening, may also be appropriate but should be performed only under the direction of an architectural conservator.
  - o A pencil-point nozzle shall be used to allow more complete control. Nozzle shall allow for independent control over air, water and abrasive and should be held no closer than 12" from the surface to be cleaned.
  - o Flush all surfaces with water to remove all traces of slurry and spent abrasive. Final rinse shall contain rust inhibitor with no more than 5000 ppm.
  - o Caution: larger concentrations of rust inhibitor will result in the deposition of salts on the metal surfaces, which will cause the paint to peel.
  - o Dry surfaces immediately, especially any horizontal surfaces or water traps which might collect water.
- e) Prime as soon as possible after surfaces have been dried but before rust has a chance to form again.
- f) Caulk all areas which have been damaged by the abrasive cleaning, especially seams, screw and bolt holes, and at junctures with dissimilar materials.
- g) Fill all holes, depressions and cracks with metal filler and sand to be flush with surrounding contours.
- h) Prime and paint all surfaces.



- vi. Protect cleaned or final finishes from damage during building or project cleaning period by use of temporary protective coverings. Remove protective covering at time of Substantial Completion.

### 7. REMOVING PAINT FROM WROUGHT, CAST IRON AND STEEL USING CHEMICAL METHODS

- i. Before work is begun on removing the existing paint film or otherwise preparing the surface all sources of excess moisture shall be inspected and repaired or replaced as required.
- ii. Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces from exposure to their products.
- iii. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.
- iv. Protect unpainted metal from contact with alkali chemical cleaners by covering them either with liquid strippable masking agent or polyethylene film and waterproof masking tape.
- v. Protect adjacent surfaces, including grass, shrubs and trees with paper, drop cloths and other means. Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations.
- vi. All waste material shall be collected at the end of each work day and properly disposed of. It is considered Hazardous Waste.
- vii. Work area shall be sealed to prevent the spread of dust and debris beyond the work site.
- viii. If vacuums are used to clean area, machines shall be equipped with HEPA (High Efficiency Particulate Air) filters to insure all lead dust has been contained and removed.
- ix. Execution:
  - a) Rust Removal:
    - o Brush apply commercially available chemical rust removers such as "Naval Jelly" (phosphoric acid), and allow to dwell according to manufacturer's instructions.  
*Caution: stay away from hydrochloric acid based products as they may lead to future corrosion.*
    - o Wipe of residue with mineral spirits and either steel wool or sox rags.
    - o Dry immediately with clean sox cloths or using an industrial blow dryer. Follow direction of grain in metal. Do not touch cleaned ornamental metal surface.
    - o Prime immediately to prevent rust.
  - b) Clean small pieces which can be removed  
*Note: remove only as much paint and rust each day as can be primed that same day. Bare iron and steel will begin to rust again within a matter of hours. It should not be allowed to sit unprotected overnight.*

- o Soak in a solution of hot water and TSP, TSP-Substitute, or sudsy ammonia to loosen the paint.
- o Remove paint with scrapers and/or a wire brush.
- o A final wipe down with mineral spirits may be necessary to help remove final traces of paint.
- o Dry immediately and prime to prevent rusting. A heat gun, set at the lowest temperature, can be used to hasten the drying time.

*Do not use high heat as this may distort the metal members.*

- c) Remove any loose paint not already removed with the rust using a chemical paint remover.

*Note: if the paint is adhering soundly leave it alone-it provides extra protection. Feather the edges of these areas to provide a smooth finish and appearance.*

- o Brush the chemical onto the surface in the amount recommended by the manufacturer. Thicken if necessary with cornstarch or fumed silica.
- o Cover with plastic and allow to sit or "dwell" according to the manufacturer's instructions.
- o Remove sludge using scrapers and steel wool. A second application may be required on those areas where paint is especially thick or the detail is intricate.
- o After removal has been completed using chemicals rub all surfaces down with mineral spirits to remove all traces of chemical and waxy residue.
  - i. To test whether all chemicals have been removed and a neutral pH achieved, dissolve a 2" piece of phenolphthalein in denatured alcohol.
  - ii. Brush the solution onto the surface. If it turns a shade from pink to magenta there is still chemical residue.
  - iii. Treat the surface with additional mineral spirits and continue testing until there is no color change in the phenolphthalein solution.
- o Dry thoroughly and prime immediately to prevent rust.

- d) Paint all surfaces.

## 8. REMOVING PAINT FROM WROUGHT, CAST IRON AND STEEL USING THERMAL METHODS

- i. Before work is begun on removing the existing paint film or otherwise preparing the surface all sources of excess moisture shall be inspected and repaired or replaced as required.
- ii. Protect adjacent surfaces, including grass, shrubs and trees by covering with paper, drop cloths and other means. Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations.
- iii. All waste material shall be collected at the end of each work day and properly disposed of. It is considered Hazardous Waste.



- iv. Work area shall be sealed to prevent the spread of dust and debris beyond the work site.
- v. After paint removal is complete, area shall be vacuumed with machines equipped with High Efficiency Particulate Air (HEPA) Filters to insure all lead dust has been removed.

vi. Execution:

*Note: remove only as much paint and rust each day as can be primed that same day. Bare iron and steel will begin to rust again within a few hours. It should not be allowed to sit unprotected overnight.*

a) Flame cleaning:

*Note: flame cleaning must be performed by an experienced operator for if done too slowly loose scale and other foreign material can be fused to the metal rather than removed from it.*

- o Flame cleaning may be executed under both damp and wet conditions and will help dry the surface.
- o Flame cleaning is NOT recommended on cast iron because of thermal stresses which can be created by overheating in localized areas. It is also not recommended for thin sections of steel or wrought iron, e.g. window sash and frame members, because of the danger of distorting the metal.

b) Heat gun:

*Note: a heat gun may be of limited use in removing paint from cast iron and steel. Testing should be done using thermal, abrasive and chemical methods to determine which is the most efficient while also preserving the metal substrate.*

- o Aim nozzle at painted surface until the paint begins to bubble.
- o Using scrapers or dental picks or other similar tools remove paint before it begins to cool.  
*Caution: do not hold gun to any one area for an extended period of time to avoid overheating the substrate.*
- o Using a clean, sox cloth, wipe the surface with mineral spirits to remove all residues.

### 9. PATCHING SCALING CONCRETE MASONRY

- i. Cut back damaged area to stable material. Roughen the surface with a hammer and chisel.  
*Caution: avoid grinding the material in this process, because it leaves the surface too smooth to achieve a proper bond.*
- ii. Remove all rust from any exposed rebar.
- iii. Cut out any rebar which is severely corroded and splice Paint freshly cleaned rebar with an epoxy coating to prevent further rusting.
- iv. If the patch is unusually large, drill holes into sound substrate and insert stainless steel pins anchored with epoxy.
- v. Remove all dust and debris by water blasting, air blasting, or with a broom or vacuum.
- vi. Square off the perimeter of the area to be patched so that a feathered edge will not be required.
- vii. About 1 hour before making repair, moisten surface of area to be patched.



- viii. To insure a good bond between patch and substrate, brush substrate surface with either a cement wash or a bonding agent such as Acryl.
- ix. Apply patching material, with a trowel, in 3/4" layers, compacting thoroughly after each layer.
- x. Work the finished surface carefully making sure to match texture and appearance of surrounding surfaces.

*Note: patching mix should match as closely as possible, the texture and color of the original.*

### 10. PREPARING A NON-TOXIC WATER-REPELLENT PRESERVATIVE

*This will make 5 gallons of solution.*

- i. Melt (1 lb.) parawin in double boiler being careful not to get it too hot as it can ignite. Temperature should range between 80 and 100degrees F.
- ii. Allow to cool to about 70 degrees F before adding the preservative mixture.
- iii. *Caution: fumes are highly toxic wear protective clothing including goggles works outside use an organic vaporrespirator.*
- iv. Add (3 gallons) boiled linseed oil and (1 gallon) mineral spirits.
- v. Apply the mixture at 70 degrees F to 80 degrees F. below 40 degrees F the parawin is not sufficiently liquid and the material cannot penetrate. Above 80 degrees F the mixture dries too fast and will not achieve sufficient penetration.

### 11. APLYLYNG A WATER-REPELLENT PRESERVATIVE TO WOOD

- i. The surface should be free of all loose fibers, dust and grease before application of a WRP.
- ii. Dipping is the most effective means of treatment, especially for the ends of wood members. Brushing to the point of refusal (total saturation) is the next best method of treatment.
  - a) For treated lumber, dip freshly cut surfaces before installation, 10 seconds to 3 minutes.
  - b) For untreated lumber, dip, brush or spray with preservative. Pay particular attention to end grain and joints.
  - c) For wood shingles, dip before installation, with a second coat brushed onto the surface after installation.
  - d) On fixed surfaces, use a minimum of two successive coats.
  - e) For pieces that are removable, soak for 10 seconds to 3 minutes.
- iii. NOTE: On a smooth surface, 1 gallon of WRP will cover approximately 250 square feet, depending on the manufacturer. On a rough surface, it will cover only 100-150 square feet.
- iv. Allow adequate time for WRP treatment to dry before repainting so that paint will adhere properly. Always follow the manufacturer's instructions.
  - a) In general, if the surfaces have been brush-treated, a drying time of 48 hours at 70 degrees Fahrenheit is generally sufficient.
  - b) Longer drying times will be required if ambient temperatures are below 70 degrees Fahrenheit at any time during this drying period.
  - c) Wood that has been dipped for 10 seconds will need a minimum of one week of similar, ideal drying time.

- d) If it is too cold in the evenings for any paint film to dry properly (i.e. if it falls below 50 degrees Fahrenheit overnight), only apply a WRP at this time, and wait for warmer weather (even if this means waiting for springtime) to prime and paint over it.
- v. In addition to adequate drying times, some wood surfaces treated with water repellents/WRP's must be allowed time to weather before they can be painted. Follow the manufacturer's instructions, as the weathering time can vary from six months to two years.
- vi. Caulking joints is an important part of surface preparation. You should generally caulk after a WRP or water repellent has been applied. However, check the manufacturer's specifications for both the preservative and the caulk being used, to ensure compatibility and attain maximum performance.

### 12. SURFACE PREPARATION FOR PAINTING WOOD

- i. Spot-prime exposed ferrous metals such as exposed nails heads that could come in contact with surfaces that are to be painted over with water-based paints. Use a suitable corrosion-inhibiting primer capable of preventing flash rusting and compatible with the coating being used.
- ii. Lightly sand all surfaces, either by hand or with a sheet orbital sander, using fine grade sandpaper.
- iii. Chemical paint remover's oxen raise the wood grain. Any rough fibers of raised grain will need to be sanded smooth as they will otherwise weaken the paint film causing premature paint failure.
- iv. Thermal methods of paint removal oxen leave behind hard particles of paint residue. These will also need to be removed prior to repainting to ensure a smooth paint finish.
- v. Other paint removal technologies include steam generators (like those used for wallpaper removal) and infrared paint stripping.
- vi. If only limited paint removal is required, feather edges of sound paint to provide a smooth transition between the old and the new paint. Use either hand methods or a sheet orbital sander.
- vii. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of putty or plastic wood filler to finish surface imperfections. Sand smooth when dried.
- viii. Fill all nail holes, voids, surface defects, etc. prior to refinishing.
- ix. Putty stop holes where nails are set and screws countersunk on all finished woodwork.
- x. Use putty or spackle to repair voids, cracks, minor splits, and similar surface in finished woodwork that is to be painted or stain-varnish finished.
- xi. Recondition wood to ensure a tight bond between the new paint and the wood. That is not reconditioned after paint removal may absorb too much of the binder in the paint, resulting in poor binding of the prime coat.
- xii. If all paint has not been removed, wash the painted surfaces to remove all grease, dirt and mildew, and to ensure adequate adhesion of the prime coat.
- xiii. Apply a water repellent or water repellent preservative (WRP) to all exterior items that are subject to extreme weather conditions, that are especially dry or that may have been consolidated.



- xiv. These exterior items include windows, cornices, or other severely peeling or exposed wood features.

## 13. GUIDELINES FOR IDENTIFYING HISTORIC PAINT COLORS

- i. When to Specify the Use of Historic Colors: In painting contracts involving historic properties, specify the use of historic colors for the following locations:
  - a) All exterior painted surfaces.
  - b) Lobbies, entrance vestibules, corridors, auditoriums, libraries and other public spaces.
- ii. Historic Paint Color Identification:
  - a) Paint analysis uses laboratory techniques developed for the field of art conservation to identify and document original paint colors and components. An ultra-violet light microscope is used in the laboratory to identify pigment and binding media.
  - b) Paint color documentation involves cutting through existing paint layers, examining paint stratigraphies under magnification, and matching the first (i.e. original) layers to a standard color system. Standard color systems allow precise documentation of original colors, using alpha numeric codes which describe the color attributes of hue (pigmentation), chroma (color intensity), and value (lightness/darkness). Each alpha numeric code corresponds to a unique color card which can be matched to any modern paint.
- iii. Computer Color Matching: Computer color matching machines, available at most major supply centers, eliminate the subjectivity of visual matching and error which occurs when paint colors are matched under different lighting conditions than those present in the historic building, a phenomenon called "metamerism".
- iv. Documentation for Paint Analysis: The conservator must perform all services and provide all materials and equipment necessary to complete the study and prepare the report.
  - a) Provide paint sampling, analysis, and a written report of findings and repainting recommendations for each location required. The following report format is recommended:
    - o Introduction: State the purpose of the paint analysis, recognize the sample locations, and explain the "period of significance" for paint restoration. Provide the following:
      - i. Building name, number, and location.
      - ii. Areas subject to analysis.
      - iii. Examination dates and analysis names.
      - iv. Research methods.
    - o Paint Seriation Charts:
      - i. Present paint seriation charts (color- finish history) graphically in columnar charts. Head each column with the name of the substrate, primer, first finish layer, second finish layer, and so on, with the present paint layer shown last, at the bottom of the column.



- ii. Align paint chronologies of different elements so that the paint scheme for any period can be read across a single horizontal line.
- iii. For materials originally left unpainted, name the substrate at the top of the column, as for other elements, and indicate "(unpainted)" in the line corresponding to the original finish layers. Provide a Munsell or Plochere code for the color of the substrate.
- o Observation/Findings: Describe paint evidence in clear, physical terms, e.g., "first layer primer", "first finish layer", rather than "first significant layer", or other terms ambiguous as to the position of the layer in the seriation.
- o Conclusion: Explain in general terms how the paint analysis findings relate to the overall design of the space. State clearly what is known and what is not known from the paint analysis. Do not abbreviate or restate the analysis findings.
- o Recommendations: Provide recommended restoration colors:
  - i. Provide a narrative and a list of recommended finishes, by location, including common color names for paints and stains, Munsell or Plochere color codes, gloss levels, and clear finish types.
    - 1. Recommended Colors and Finishes
      - a. List: List elements vertically by location (e.g. "First Floor Main Lobby: Ceiling: Rosette, Cower, Fret Molding, Fret Background", etc. On horizontal axis, correlate each architectural element (listed in the left column to the recommended paint/stain color name, finish (gloss level, texture, vehicle for clear coatings), and standard Munsell Plochere color code (listed in the right columns).
    - 2. Decorative Finishes: Break original multicoat decorative finishes (eg. Glazed paints), graining out by component layers and describe the overall intent, or common name of the decorative treatment. Note the type of decorative treatment in the list.
    - 3. If the list does not provide adequate space, name the components, or layers of the decorative system in a separate section. For example, "mahogany graining" may be broken down into a ground paint layer followed by one or more glazes; a gold leaf

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finish might include a yellow bole, gold leaf, and alacquer, and antiqued imitation gold leaf finish might include a "Dutch metal" leaf made of ground copper and zinc followed by several textured glazes. Key the ground or base of each decorative system to the Munsell or Plochere system. Narrative: Explain the paint recommendations within the larger restoration context. Unless unusual historic considerations dictate otherwise, paint restoration must return the building to its original appearance, i.e., as designed by the original architect. Justify the recommended color scheme. Emphasize that colors, both natural and applied, were part of the original architect's design.

4. Period of Significance: In rare cases, the "period of significance" for restoration may not be that of the earliest paint scheme. The Conservator must provide strong justification, based on scholarly restoration principles, for restoration paint schemes using colors other than the original colors identified by the paint analysis. Such exceptions are most likely to occur when the building has experienced significant alteration over time, and when the alterations have acquired significance in their own right. Check with the Regional Historic Preservation Officer prior to starting analysis to determine if such direction is already recognized.
5. Recommended colors for materials originally left unpainted: Match the substrate to the Munsell or Plochere system. Describe the material's primary natural color names. Recommend whether or not stripping to restore the natural finish is advisable. For example, stripping may not be advisable if the surface has been patched with dissimilar materials or the substrate is deteriorated or extremely.
6. Recommended colors for features lacking original paint: The recommendations for repainting must address gaps in the physical paint evidence. Provide recommended colors for all of the painted surfaces in the space.

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Draw analogies, if possible, between elements with known original paint colors (or clear finishes) and non-original or stripped elements for which physical paint evidence is unavailable.

7. When paint evidence is unavailable, or an element is not original, prescribe restoration colors/finishes using the following types of evidence, in order of priority:
  - a. Physical paint evidence from the same area of the building.
  - b. Physical paint evidence from another, similar area of the building.
  - c. Historical documentation on the building, such as the architect's original specifications or architect's intent.
  - d. Physical paint evidence from studies of other buildings of the same period, style, and type, preferable in the same region.
  - e. Scholarly research (primary or secondary, cite sources) on architectural paint styles and practices of the period. Appropriate primary sources include paint research on other buildings, period taste books, period paint manuals, manufacturer's paint palettes of the period, letters, diaries, paintings, etc.
- ii. Provide the government with a detailed listing of the number of samples required to identify all colors at these locations and the cost to provide sampling and analysis. Also provide a narrative that documents the following:
  1. The actual methods used, including all tools and equipment.
  2. Paint analysis findings, describing original color schemes for each location.
  3. Any special comments on paint techniques or materials.
  4. Recommendations for repainting.
    - a. Do not sample elements which visual inspection indicates are not original.
    - b. Prepare paint chronology charts for all paint layers on the sampled



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surface. Match the first finish paint layer to the Munsell or Plochere standard color notation system; identify other colors by common color names.

- i. Record all paint layers on standardized paint seriation charts, using common color names. Show common color names and color codes for first significant layers. Should a color fall between two such codes, list both codes, separated by a dash (e.g., 5Y9/1-5Y9/2).
  - ii. Record each layer of each different portion of the building fabric in corresponding layering sequence, so that the overall color scheme of each period of the building's history can be readily seen.
- c. Provide 3"x5" color chips (1 set) for the earliest or most significant (if predetermined not to be the original finish layer) color scheme, as a matching guide for repainting. If there are two periods of significance, provide color chips for both periods.
- d. Provide graphic illustration of color scheme: Show the location of each color or paint technique on drawings, floor plans, diagrams, or photographs. If original or subsequent drawings of the building exist, the Government will provide them. For complex polychrome surfaces, illustrate the recommended paint scheme on a section (profile) sketch, with broken lines marking where breaks between colors occur.
- e. Identify original finish systems for clear finished wood elements. Match original stain colors to the Munsell or Plochere systems. Solvent test to

identify the type of finish (shellac, varnish, lacquer)

### 14. CONTROLLING TERMITES WITH TERMICIDE TREATMENTS

- i. Inspect all wood portions of a building for insect damage least once each year. Look for signs of insect activity, such as:
  - a) Clay tubes on pieces of wood
  - b) Small holes in the wood
  - c) Small unexplained piles of sawdust
- ii. If any of these signs appear between inspections, an insect control specialist should be called in to make a thorough investigation.
- iii. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated.
- iv. Execution:

*Note: termiticide treatment will not strengthen deteriorated wood. Structural members that are no longer sound must be repaired or replaced.*

#### a) For Spot Treatment of Infested Areas:

- o Dilute termiticide concentrate with water according to manufacturer's instructions.

*Note: fuel oil is not permitted as a diluent.*

- o Saturate the infested and surrounding area with diluted termiticide using a spray. Apply at rate recommended by manufacturer.

*Note: be sure to treat the entire infested member to ensure that the active ingredient in the concentrate remains at a level high enough for effective control. Wood that has not been treated will not be protected.*

- b) Post signs in areas of application to warn workers that termiticide treatment has been applied. Remove signs when areas are covered by other construction.
- c) Reapply treatment solution to areas disturbed by subsequent construction activities following application.

### 15. CLEANING AND STRIPPING PAINT FROM PLASTER SURFACES

- i. Protect surrounding surfaces from damage resulting from chemical cleaning and paint stripping work.
- ii. Dispose of by-products from cleaning and paint stripping operations by legal means and in manner which prevents damage to other surfaces.
- iii. Develop a work plan indicating recommended treatments for surfaces/areas.
- iv. Prior to cleaning and stripping work, remove cellophane tape, masking tape, etc. from surface.
- v. Cleaning Existing Plaster Surfaces:
  - a) Mix TSP with warm water to create cleaning solution.
  - b) Scrub surface with a cloth, sponge or soft-fibered brush and cleaning solution.
    - o Proceed with cleaning and stripping in an orderly manner; work from bottom to top of each surface and from one end of each surface to the other.

- o Perform each cleaning and stripping method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to surfaces.
- c) Sponge rinse surface thoroughly using clean water to completely remove chemical residue and soil. Change rinse water frequently.
  - o Rinse off chemical residue and soil by working upwards from bottom to top of each surface and from one end of each surface to the other.

*Note: there is some difference of opinion as to whether it is best to wash a wall working from the top down or from the bottom up. Bottom up is safer because solution streaks running down on a dirty wall cannot be removed. The important thing is to work dry enough to avoid drips.*
- d) Repeat process as required.
- e) Wipe the surface with a dry clean cloth to prevent streaking.
- vi. Stripping Paint from Plaster Surfaces:
  - a) Carefully apply commercial stripper to painted surface with a brush. Follow manufacturer's instructions and precautions.
  - OR-
  - Prepare a glaze remover: Mix 5 parts denature alcohol, 3 parts mineral spirits and 1 part acetone and apply to the surface.
  - b) Allow commercial stripper or glaze remover to remain on surface for length of time recommended by manufacturer and required to emulsify paint build-up.
  - c) Carefully remove emulsified paint with a putty knife.
  - d) Repeat process as many times as required to remove paint build-up.
  - e) Neutralize chemical stripper by wiping surface with a cloth wet with clean water. Change water frequently.
- vii. Upon completion of this work, all floors, walls and other adjacent surfaces that are stained, marred, or otherwise damaged by work under this section shall be cleaned and repaired and all work and the adjacent areas shall be left in a clean and perfect condition.
- viii. All completed work shall be adequately protected from damage by subsequent building operations and effects of weather.

## 16. STRIPPING BUILT-UP FLOOR COATINGS FROM TERRAZZO

- i. Take all necessary precautions and measures to protect all surrounding materials from damage that might be incurred during the terrazzo restoration work describe in this outline specification.
- ii. Improper use of chemicals may constitute a health hazard. Refer to manufacturer's Material Safety Data Sheets for hazard data, special protection, for use and precautions to be taken in handling and storage. Comply with manufacturer's recommendations for proper use of chemicals.
- iii. Strip built-up floor coatings from the terrazzo flooring by applying a dilute cleaner. Let dwell for 5 to 20 minutes depending on test trial results, scrub with fiber bristle brush, a mechanical floor machine, or white nylon pad, and rinse with low pressure cold water (less than 100 psi).



- iv. Do not use metal brushes. Repeat application for stubborn build up. Do not allow cleaner to dry on the floor.
- v. Apply penetrating type sealer to reduce the porosity of the terrazzo and increase its resistance to acid and alkalis. Follow manufacturer's instructions.

### 17. STRIPPING AND CLEANING DIRTY OR DISCOLORED TERRAZZO FLOORS

- i. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for stripping terrazzo surfaces.

*NOTE: The following procedure calls for stripping the floor down to the original surface, cleaning if necessary, and then sealing with a long-lasting sealer.*

- ii. Strip existing sealers and coatings from floor:
  - a) Apply chemical floor cleaner with paint roller and let stand for five to ten minutes. Work in areas no more than four feet wide to insure that the applicator is always standing on a dry floor.
  - b) Using a low pressure tank sprayer, apply a mist of water over the cleaner already on the floor. The water will emulsify the old sealer and dilute the thixotropic cleaner.
  - c) Pick up all remaining residues with a wet vac.
  - d) Using a power scrubber with a scrub brush attachment, scrub the floor until all coating material has been removed.
  - e) Pick up all liquid residues with a wet vac.
  - f) Pick up all remaining liquid residues with a wet vac and allow to dry.

-OR-

- iii. If dirt and scratches have become so severe that normal stripping and cleaning no longer restore the floor to its original luster, the surface may be stripped using fine grit stones and resurfacing screens.

*CAUTION: This method of removing sealers and coatings involves grinding off a thin layer of the terrazzo. It should only be used as an extreme measure and a specialist must be consulted.*

- iv. If the floor is still dirty, clean using Sure Klean Grout and Tile Cleaner (ProSoCo, Inc.), or approved equal.
  - a) Dilute three to four parts water to one part Grout and Tile Cleaner.
  - b) Pre-wet area to be cleaned.
  - c) Apply cleaning solution with floor scrub brushes.
  - d) Let stand two to three minutes while lightly agitating with a stiff, natural bristle brush, broom, or nylon brush.
  - e) Thoroughly rinse the surface with clean, clear water.
  - f) Pick up all remaining liquid residues with a wet vac and allow to dry.
  - g) Seal the terrazzo surface with high strength sealer according to manufacturer's instructions.

### 18. ROUTINE PREVENTIVE MAINTENANCE GUIDELINES FOR TERRAZZO

This standard includes guidelines for maintaining terrazzo floors on a daily and periodic basis.

- i. Scrub new terrazzo several times a week and mop on remaining days.

- ii. Cleaning compounds used on terrazzo should be free from alkalies, acids, or other strong ingredients which can permanently damage the floor.
- iii. Avoid acids and washing solutions containing carbonates or trisodium phosphate.
- iv. Do not use sweeping compounds containing oil, sand or abrasives.
- v. The floor must be carefully rinsed after cleaning.
- vi. All cleaning solution and rinse water must be picked up, by mop or wet-dry vacuum, to prevent slipperiness.
- vii. Do not use soaps and scrubbing powders containing water soluble, inorganic salts, or crystallizing salts in the maintenance of terrazzo.
- viii. The cleaning cycle should be regulated by the amount of traffic.
- ix. For general cleaning, use a neutral cleaning compound diluted in accordance with the manufacturer's directions.
- x. For very dirty areas, increase the amount of compound.
- xi. The floor should be pre-wet with clean, warm water before beginning the washing operation.
- xii. A mop dressing used for daily sweeping should be non-oily.
- xiii. Sweeping compounds containing oil will penetrate and permanently discolor terrazzo.
- xiv. Sweeping compounds containing sand are difficult to sweep up and may abrade the surface if left on the floor (wax-treated dustmops and sweeping compounds are good).
- xv. Electric or battery-powered scrubbing machines should be used periodically with a solution of neutral compound to loosen dirt.
- xvi. Floor machines should be equipped with fiber brushes, or with abrasive nylon pads.
- xvii. Buffing the floor with a powered machine after each cleaning restores the luster to the surface, building a natural sheen.
- xviii. Steel wool should not be used on terrazzo; it may rust and stain the surface.
- xix. Terrazzo floors containing abrasive aggregates should never be sealed; they should be scrubbed regularly to keep them free of build-up of dirt and other foreign matter.

### 19. RE-GRINDING TERRAZZO FLOORS

- i. This procedure includes guidance on resurfacing terrazzo floors to remove sealers and coatings when normal stripping and cleaning is not sufficient to restore the floor to its original luster.
- ii. Grind and polish the terrazzo floor as required to produce a clean, smooth, and uniform finish, capable of being sealed and polished to match existing.
- iii. For small areas, sand surface with a hand sander or small grinding tool, using fine stones to achieve desired finish. For larger areas (such as floors), use a circular buffing machine with grinding and polishing pads.
- iv. Use a #24 or finer grit stone/screen for the initial grinding, exposing the marble chips. Fine mesh sand may be used if necessary. Follow with a fine #80 or finer grit stone/screen.
- v. Rinse floor thoroughly with clean, clear water.



- vi. Remove excess rinse water and machine or hand apply grout using identical Portland cement, color and pigments as used in topping taking care to fill all voids completely.
- vii. Cover grouted surface with paper or polyethylene for at least 72 hours.
- viii. Final polish with a #80 or finer grit stone until grout has been removed from the terrazzo surface.
- ix. Wash surface with neutral cleaner and thoroughly rinse with clean, clear water.
- x. Allow the surface to thoroughly dry.
- xi. Seal terrazzo with a penetrating type sealer as recommended by manufacturer.

### 20. PATCHING MINOR CHIPS AND CRACKS IN TERRAZZO WITH CEMENT GROUT

- i. This specification provides guidance on repairing small cracks in terrazzo floors by patching with cement grout.
- ii. With a power saw or hand tools, cut a vertical perimeter wall around the area to be patched. If the patch is smaller than an inch square, slightly undercut this edge.
- iii. Clean all debris from surface.
- iv. Saturate void with water to prevent quick surface drying. Ensure that water penetrates into the surface in order to achieve a proper bond.
- v. Clean surfaces until any obstructing material has been removed.
- vi. Apply cement paste and work into the surface. Do not allow cement paste to dry before placing terrazzo composition.
- vii. Match marble chips and matrix for existing terrazzo by size, mineral content and color. Colors should be matched after cleaning or matched with samples taken from the interior of core samples, depending upon scope of work.
- viii. Mix two parts blended marble chips with one part Portland cement and add enough water to make the mixture plastic.
- ix. Place mixture over chip or crack and level with a trowel.
- x. Seed additional marble chips of the same blend over the patch, as required to establish a uniform coverage.
- xi. Compact patch, removing all excess water and cement from the surface.
- xii. Cover the patch with paper or polyethylene sheeting to prevent quick hydration.
- xiii. Cure until topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.
- xiv. Sand surface with a hand sander or small grinding tool, using fine stones to achieve desired finish.
- xv. Use a #40 or finer grit stone for the initial grinding, exposing the marble chips. Follow with a #80 grit stone before grouting with cement to fill all pinholes.

### 21. EPOXY PATCHING CRACKS IN TERRAZZO FLOORS



- i. Remove all foreign matter from the void, followed by routing with a power tool. Remove all sealer from the surface adjacent to the void with a stripper or ammonia.
- ii. Blend the resin materials to match the color matrix, by adding marble dust or pigment.
- iii. Force mixed resin into the void, making sure it is pressured into the crack as deep as possible. In some cases, the supplier will instruct using a primer for their materials.
- iv. If the void is large enough, and the intent is to disguise the line so it will blend into the rest of the terrazzo floor, irregularly place marble chips matching the existing terrazzo blend along the line approximately one to two inches on center. Be sure to do this, however, while the patching resin is still in a wet state. Finally, tool off surface and allow to cure.
- v. When the material has hardened, sand surface with a hand sander or small grinding tool, using fine stones.
  - a) Use a #40 or finer grit stone for the initial grinding, exposing the marble chips. Follow with a fine #80 grit stone before grouting with cement to fill all pinholes.  
*Caution: divider strips may be coated instead of solid composition. Coated strips should not be ground. Grinding may cause coated divider strips to lose their coating and discolor.*
  - b) Cover grouted surface with paper or polyethylene for at least 72 hours.
  - c) Thoroughly rinse the surface with clean, clear water.
  - d) Remove excess rinse water and allow to dry.
  - e) Final polish with a #80 or finer grit stone. Care should be taken to limit grinding and polishing to a small distance beyond the perimeter of the patch.
  - f) For some time, this area will be noticeable, however, with normal maintenance, the area will blend into the balance of the floor.

### 22. INSTALLING A NEW BONDED TERRAZZO FLOOR TO MATCH HISTORIC TERRAZZO

- i. This procedure includes guidance on installing new bonded terrazzo to replace lost or severely damaged portions of existing terrazzo floors, or to enlarge or alter an area of existing/historic terrazzo floors.
- ii. Examine the terrazzo to determine the type of terrazzo topping used. Match marble chips and matrix for existing terrazzo by size, mineral content and color.
- iii. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for replication and replacement of select areas of existing terrazzo surfaces.
- iv. Clean and prepare substrate to comply with the type of terrazzo application indicated. Clean substrate of loose chips and foreign matter.
- v. Grind concrete substrate to provide surfaces within tolerances.