POST-WAR MODERN / MiMo

Design Guidelines

THE CITY OF MIAMI BEACH PLANNING DEPARTMENT

RAILINGS*

MiMo architecture, for reasons of economy following World War II, was a generally minimalist architectural style utilizing functional exterior elements, such as railings, to bolster the architecture and provide character defining detail. Hence, railings were imaginatively created in a wide host of patterns and materials to aesthetically dramatize this minimalist style.

During the postwar period (1945-1965), almost one thousand apartment buildings were built in Miami Beach. Most of these were one- to three-story garden apartment buildings, and the majority were designed with unit entrances via exterior corridors or private terraces. The resulting exterior stairways, corridors and balconies were primary building features. Their metal and concrete railing systems were in many cases the single most impactful exterior feature of the buildings. The railings, often quite decorative, functioned as diff erentiators for the vast stock of midcentury buildings.

Miami Beach's mid-century garden apartment buildings were a regional adaptation of Postwar Modern architecture popular throughout the US. This regional variant, often referred to locally as Miami Modern (or MiMo), contributes greatly to the identity of Miami Beach. In fact, Postwar Modern garden apartment building out-number Art Deco and Mediterranean Revival buildings in the city. Further, the vast concentration of these building in certain neighborhoods has generated at least one new local historic district, as well as two new districts on the National Register of Historic Places.

*For detailed railing guidelines please refer to Appendix A.

SPACE-AGE IMAGERY A number of MiMo landmarks capitalized on space-age imagery, such as the University of Miami's Pick Music Library, with its extending pods like those on a lunar landing module, and the Pepsi-Cola Bottling pavilion, with its spiraling floating staircases, a vision straight out of the 1953 film The War of the Worlds. Toward the end of the MiMo era, the television cartoon series The Jetsons reflected and parodied the period fascination with the future.

SPANDRELS Panels placed between the window head of one floor and the windowsill of the floor above. MiMo spandrels were often clad in glass mosaic tile or textured, painted stucco.

TEXTURED STUCCO Inexpensive stucco lent itself to the creation of textures and abstract decorative relief in the abundant Miami sunshine.

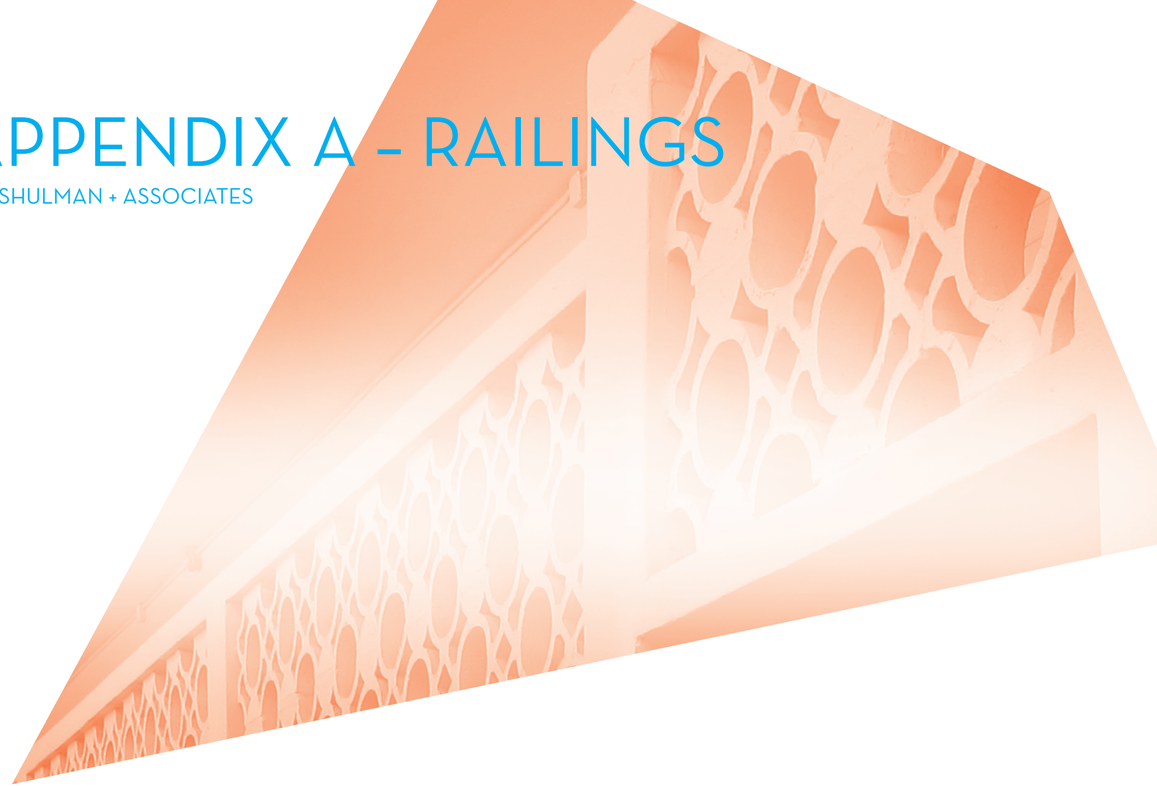
TRAY BALCONIES Cantilevered balconies with concrete parapets (low walls, usually formed by the projection of a wall above a flat roof) are used for their sculptural form in MiMo hotels and residences.

WOGGLES Biomorphic kidney shapes popular in postwar design usually appeared as ceiling coves or trays for indirect lighting.

This Glossary is adapted, with permission from the author, from "MiMo: Miami Modern Revealed" by Nash, Eric P., and Robinson Jr., Randall. Chronicle Books, San Francisco, 2004.

APPENDIX A - RAILINGS

BY: SHULMAN + ASSOCIATES

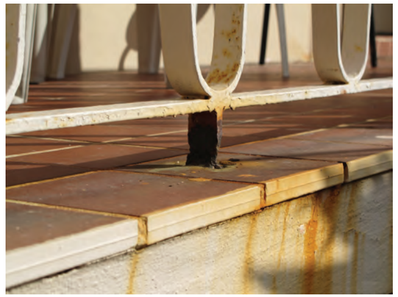


STATEMENT OF PROBLEM

Remediation, restoration or replacement of the original mid-century railings has been identified as a high priority for the City of Miami Beach. Miami Beach's highly corrosive environment, along with normal wear and tear, occasional storms and infrequent maintenance, takes its toll on metal, concrete and wood railings. Many existing metal railings display high levels of rust deterioration, causing structural instability and unsightly staining of adjacent materials. This is especially evident at the base of posts where the metal comes into contact with concrete and standing water.

In addition, many postwar railing systems do not meet current ADA and Building Codes, such as height, rejection rules, railing gripability and structural tolerances. For instance, many older guardrails rise to three feet high, whereas three foot six inches is currently required. While older railing systems are often very open, contemporary building codes require that guardrails be designed so that a four inch sphere cannot pass through any point below three feet. Contemporary codes also carefully prescribe the cross section of handrails. Existing rails may require redesign and modification or replacement during re-certifications, changes of use or substantial improvements equaling more than 50% of the value of the building to bring the buildings up to code.

Finally, current fabrication methodologies and changes in manufacturing technology and methods have made pure replication of the historic railings cost prohibitive. Materials such as aluminum, more suited to this corrosive environment have different properties from the original steel or iron railings, and so exact replication of member sizes becomes difficult.



STRUCTURAL DAMAGE

POOR REMEDIATION TECHNIQUES

LARGE OPENINGS

POOR ADAPTATION TECHNIQUES

POOR MAINTENANCE

REPAIRS USING INCORRECT MATERIALS

RAIL TYPOLOGIES

Although the designs and styles are simply too numerous to design replacement railings for each within this document, a summary of some common groups is described here to help identify each type and provide an understanding of the design intent for each type.

A Metal Bar with Mesh

The mesh railings are often framed much like a simple pipe rail, but are infilled with a horizontally proportioned panel of expanded metal mesh, delicately supported on fine bracing members offset from the corners of the panel.




RAIL TYPOLOGIES

B Metal Bar

Historically, these designs were wrought iron which is a ductile material with a high tensile strength, and can be easily shaped when hot or cold by either hammering or rolling. It is relatively good at withstanding corrosion, however Miami Beach's harsh seaside conditions test the limits, and without suitable maintenance and repairs to portions of iron exposed to the elements, substantial damage can quickly occur. Wrought iron can be heat welded quite easily, that is, fused together by hammering or pressure if brought together at an appropriately high heat. It can also be drill bolted or riveted, however heat welded is by far the most typical joining technique displayed in the existing Mimo railings on Miami Beach.

Vertical bars were usually square in section, or in the case of the Ribbon designs, were flat rectangular sections.

Handrail profiles were typically rectangular metal bar stock, with many of the more decorative profiles added at a later date.

i *Ribbon: Typically these railings are comprised of a flat metal bar stock, folded and curved between a flat bar stock bottom rail and handrail, and presenting the narrow side to the façade. This results in an exceptionally thin visible profile. These designs were more difficult to adapt, since they were quite sparse and once compliant with the 4" rejection rule, became far too dense and when viewed from even a slight angle, became too opaque. These designs would be more suitably modified using a secondary layer of mesh or glass behind to provide code compliance.*


ii *Vertical Picket with Enhancements: This style varies greatly, however the underlying concept exhibits a repetitive vertical picket, sometimes straight and sometimes twisted, broken up with a detailed elements typically located between two pickets.*


RAIL TYPOLOGIES

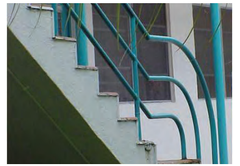
iii *Appliqué: Appliqué railings are typically a simple vertical picket railings, with plate metal attached either between the railings or applied directly to the front of the pickets. The proportion of the size of the applied plate versus the picket is important to note, and are typically quite small.*

iv *Geometric: Many of the designs display a range of diagonal striping, diamonds, 'x's and grids. These typically straight bar stock show much promise for adaptability to the current codes, however the density of the members and the profile of the stock using contemporary materials can diminish the success of the final product if not carefully designed.*

RAIL TYPOLOGIES

v *Curves and Circles: Similar to the geometric, however with curved bar stock between the bottom rail and the handrail. These are often very difficult to adapt since they are typically very open in the design and very light. Studies attempting to adapt these were typically unsuccessful, suggesting that in order to be code compliant a secondary mesh or glass element be employed.*

vi *Pipe: Common, but often forgotten, the simple pipe rail is typically simply 3 horizontal rails, with curved corners transitioning the handrail to become the newel post. These are difficult to adapt without completely modifying the design, since the spacing between the bars is too wide. Details must be concentrated on, since new pipe rail fittings typically have a male/female type connection, which does not match many of the historic conditions.*



RAIL TYPOLOGIES

C / Precast Concrete

Less common, but appearing on many of the buildings from this period, was the use of pre-cast concrete balusters, some using smaller panels cast almost like oversized concrete masonry units (CMU) spanning between the deck and a concrete hand rail. Others appear to have been cast as entire baluster units, incorporating the newel posts, handrails and spinals or rails in one element approximately 6-8' long.




D / Modular Concrete Breezeblock

Typically still in good condition, the concrete breezeblock railings tied in to the screens, providing an abstract frieze and casting an intricate play of shadows across the facades. Many of the designs are no longer in fabrication, however most already comply with the current code 4" rejection rules, so are easily adaptable and fabricators are available to provide custom designs to match the existing blocks.




RAIL TYPOLOGIES

E / Wood

Closely related to the metal bar stock railings, these metal framed railings used redwood slats for intermediate rails, and often had wide sloping handrails.




CRITERIA

In this document, we explore three principle approaches to working with original non-conforming railing systems: restore/adapt; replicate/adapt; and contemporary interpretation.

1 Restore/Adapt

Preservation may be appropriate if the original historic railings are essentially intact. Proof of the original appearance, such as photographs or drawings, is helpful in understanding the original configuration of the rails, and the extent of any changes over time. Restoration and/or adaptation is generally preferred to a wholesale removal and replacement of the existing railings; every attempt should be made to explore this methodology.

Repair and minor replacement of small portions of a railing being restored should faithfully replicate the original, using exact materials, member profiles, sections, sizes and attachment details. Minor modifications may also be possible to enable restoration of the existing original handrail, such as the addition of an intermediate member, or a glass panel behind, which may satisfy current code requirements.

When railings are original, less stringent standards are often applied, such as allowance for a 6" rejection rule rather than the 4" rejection applied to new railings. A full code analysis of the railing should be completed prior to determination that it warrants replacement.

2 Replicate/Adapt

Should a railing be unsuitable for restoration due to severe deterioration, or if the original railings have been subsequently replaced with a less historically appropriate railing, replication of the original would be preferred. Historic photos and/or drawings may provide a resource for the design of the replicated railings and all efforts should be made to provide a historically accurate replication of the original. After restoration, faithful replication and adaptation would be the next most preferred methodology for railing replacement.

If feasible, materials matching the original should be used. However, if appropriate alternatives are able to faithfully replicate the original materials they may be considered. For example, aluminum railings are often used to replace steel railing, since the material is less prone to corrosion and requires less ongoing maintenance. However, the replicate must be able to match the profiles, sizes and finishes of the original to be considered a true replication. As described for restore/adapt, minor modifications to enable faithful replication may be possible to correct minor code non-compliance issues.

CRITERIA

3 Contemporary Interpretation of the Original Railing

Should a railing be both significantly deteriorated and unsuitable for adaptation to meet current codes, a contemporary interpretation may be considered an appropriate methodology for railing replacement. Interpretation of the design of various historic modern railing systems is discussed in Appendix A, as a number of case studies have brought into focus various strategies for achieving the historic intent of the design without necessarily requiring a true replica of the original. Design input from the City of Miami Beach Planning Department should be sought in order to select an appropriate interpretive design solution. Note that for the purposes of receiving Historic Preservation tax credits, contemporary interpretation is not recommended.

4 Prevention and Maintenance

The City of Miami Beach considers original postwar railing systems a design and historic preservation resource. Building owner(s) are requested to pay attention to providing proper maintenance, timely repair and constant care for these important resources. Repairs and maintenance should be completed with the proper supervision, correct and thoughtful details and quality workmanship.

5 Understanding of the whole

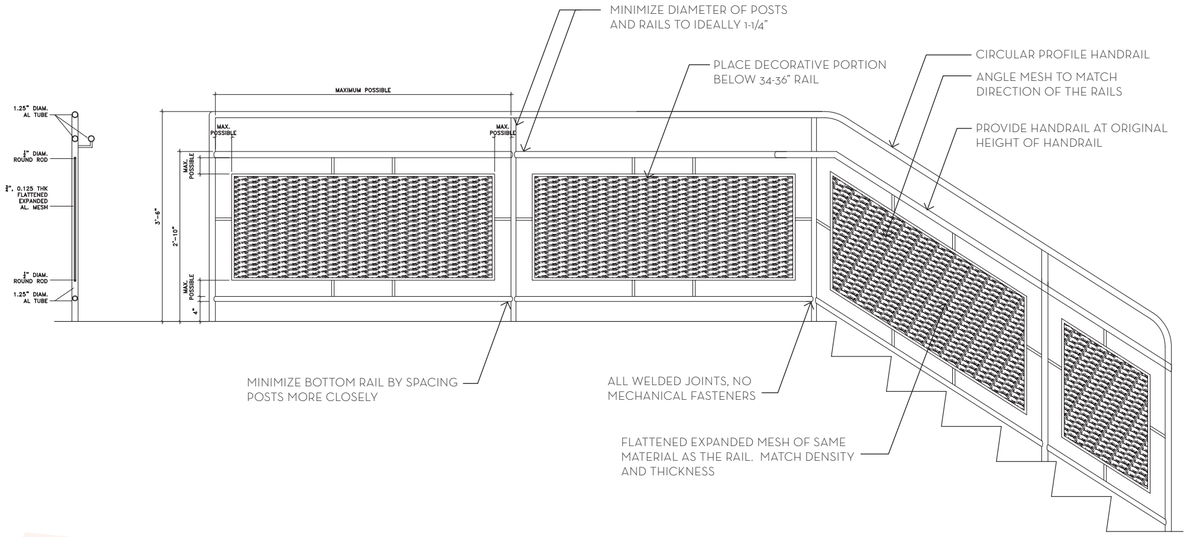
Railing systems are holistic in nature, and every part contributes to the overall aesthetic and often structural integrity of the whole. A particular detail evident in many postwar railing systems illustrates the point. In many locations, the newel post of the railing extends from the deck to the underside of the eaves, providing additional structural integrity and minimizing the need to a large diameter post or additional structural bracing. Such details are important to the design of the railings, and should be retained or replicated.

DESIGN STRATEGIES

The design studies were divided into typologies based on materiality groups described previously, rather than style, allowing for further discussion on the fabrication and installation constraints, while also addressing some overall design strategies able to be implemented across the board to adapt the railings to meet current codes.

A Mesh in Frame

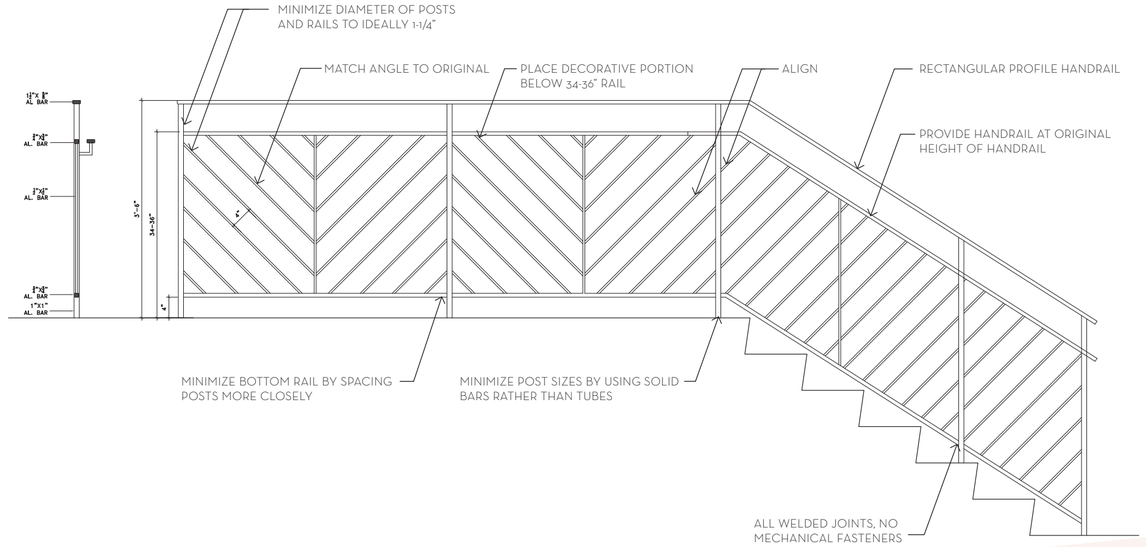
In order to maintain the overall horizontal proportions of this rail type, it is important to provide the mesh panel only below the 34-36" high rail, then float a second rail above. This strategy is important for any horizontally oriented rail design since the span of the horizontal rails is often limited to 4-5' maximum.
The mesh itself should be a flattened expanded metal to minimize sharp edges, and the size of the openings should be carefully matched to the original.



DESIGN STRATEGIES

B Metal Bar - Angle

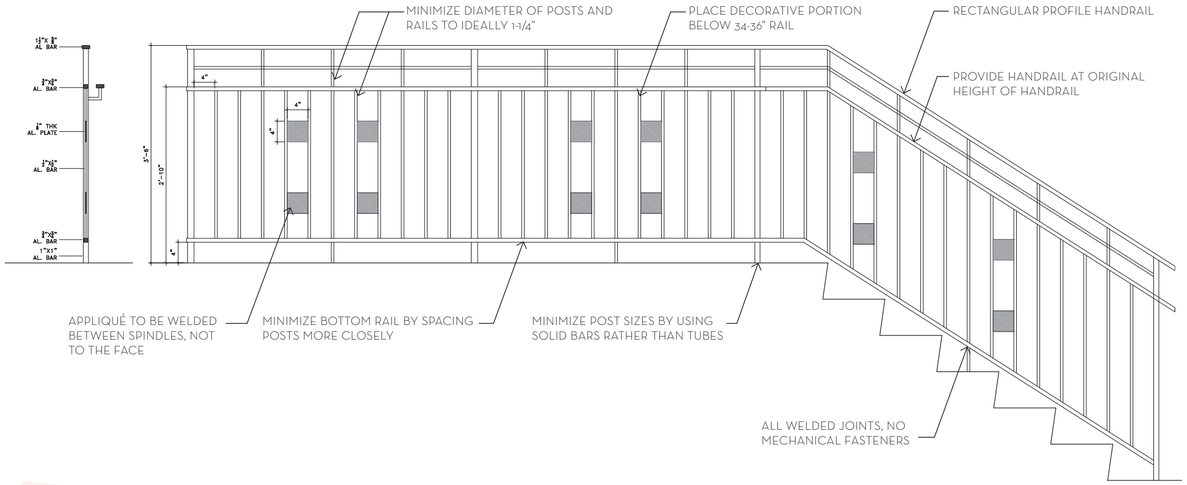
The diagonal design is a simple adaptation of a standard picket rail design, however it is important to note the proportions of the members, and the fact that the diagonals do not extend past the 34-36" high rail, to keep the denser part of the railing at the historically lower height. All other structural members should be kept to a minimum profile, and rectangular bars used for all handrails.



DESIGN STRATEGIES

B Metal Bar - Appliqué

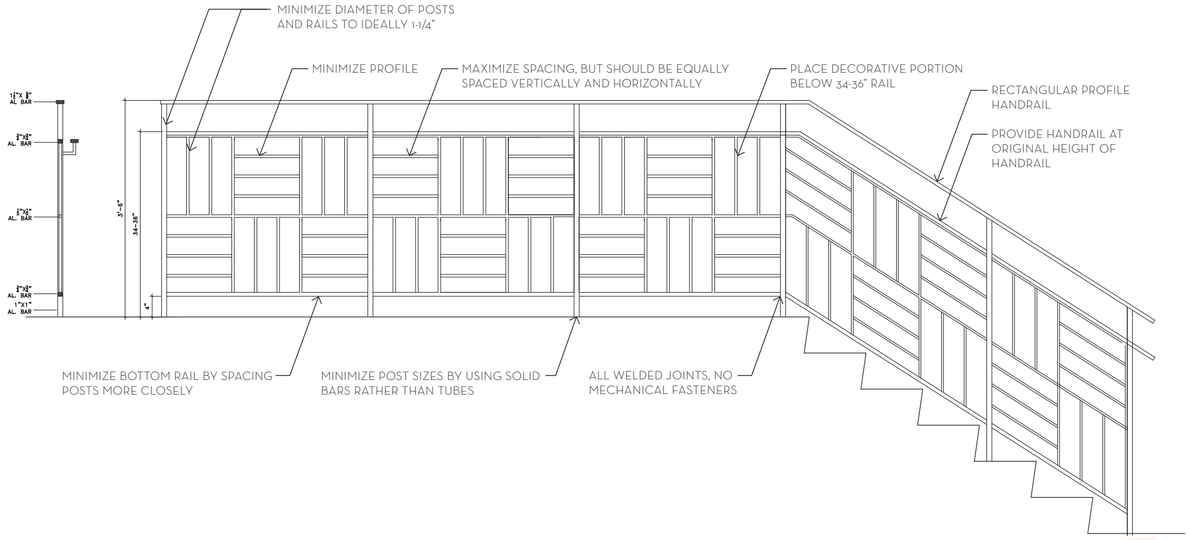
Applique designs are widely varied, however in principle, the applique should not be so large as to dominate the open/solid proportions of the original, and the attachment method to the pickets should match the existing design. The spacing of the applique in the original should be carefully noted, and the bars minimized in size as much as possible.



DESIGN STRATEGIES

B Metal Bar - Split

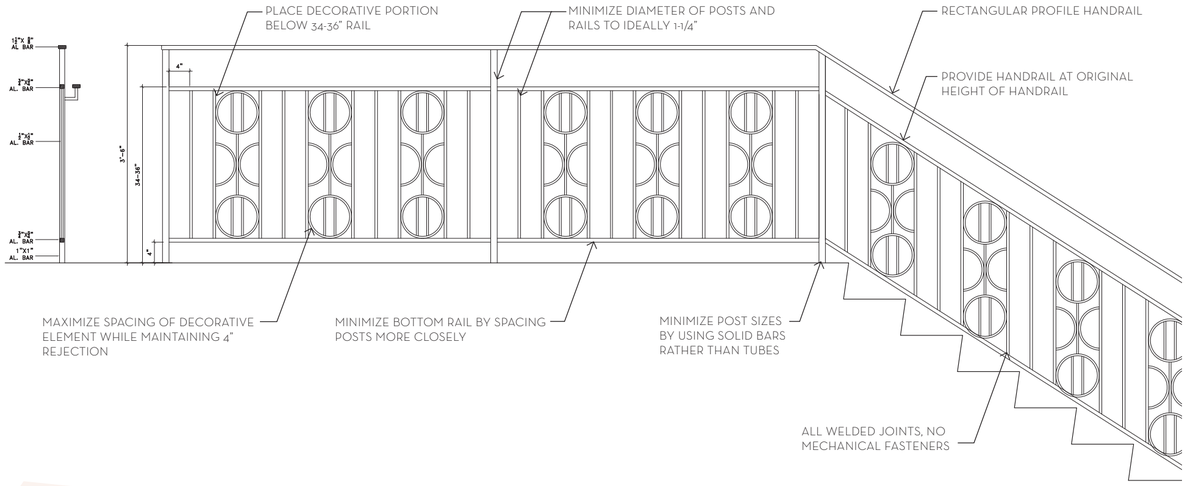
This design, while not common, was easily adapted to a number of design types, since the smaller rectangular opening allowed for the density of the original to remain while still providing for the 4" rejection as required by code.



DESIGN STRATEGIES

B Metal Bar - Circles

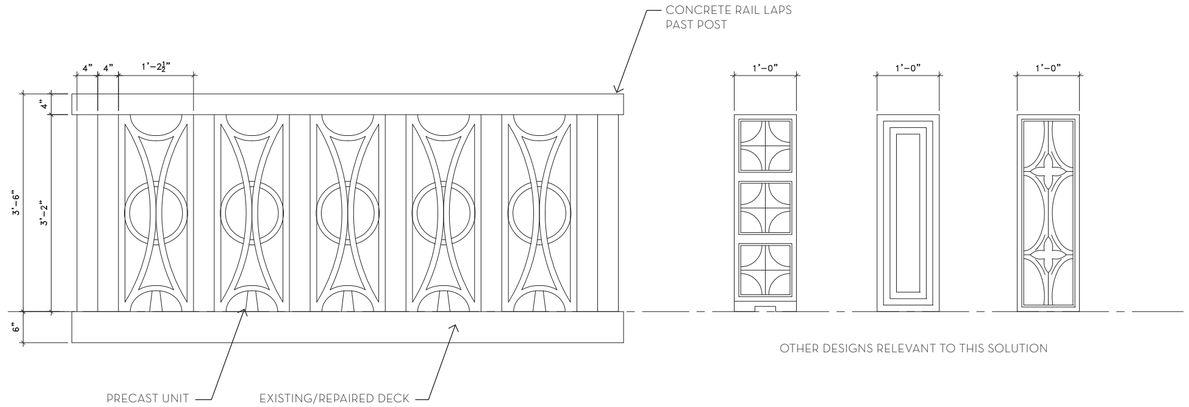
Circles are the hardest type to adjust to meet current codes. Here, the scale of the circles was kept similar to the original by only continuing the design to the 34-36" rail height. In addition, separate intermediate bars were added to the circles.



DESIGN STRATEGIES

C Precast Concrete

Precast concrete balustrades are currently difficult to source, however since these are modular units, they can be cast similar to breezeblock. To meet the current codes, units may need to be cast larger than the existing to maintain the same proportions and yet meet 42" in height. Due to increased structural standards, lightweight concrete may need to be considered.

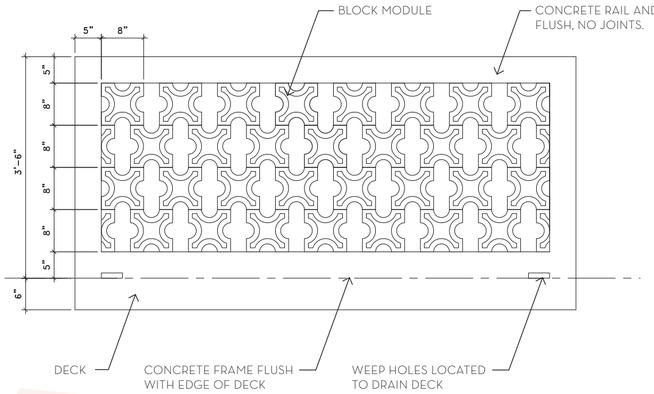


DESIGN STRATEGIES

D Modular Concrete Breezeblock: 8" x 8" Type

One of the smaller modules, 8"x8", formed open sided designs laid in an offset pattern. These formed different shaped openings between the blocks. They were used in both balustrades and screen walls. Although difficult to obtain, infill with any other block results in a poor version of the original.

SUITABLE BLOCK TYPE
DESIGN COURTESY OF LHP GROUP INC. MIAMI

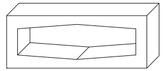


DESIGN STRATEGIES

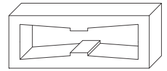
D Modular Concrete Breezeblock: 6" x 16" Type

A more slender block type, 6"x16", these blocks stack perfectly to achieve a 42" height rail with a large amount of opening. These block designs were found in original patterns with expressed joints, smooth joints between blocks, and in vertical and horizontal orientation. These details, and the original thickness of the posts and rail at the top should all be taken into consideration.

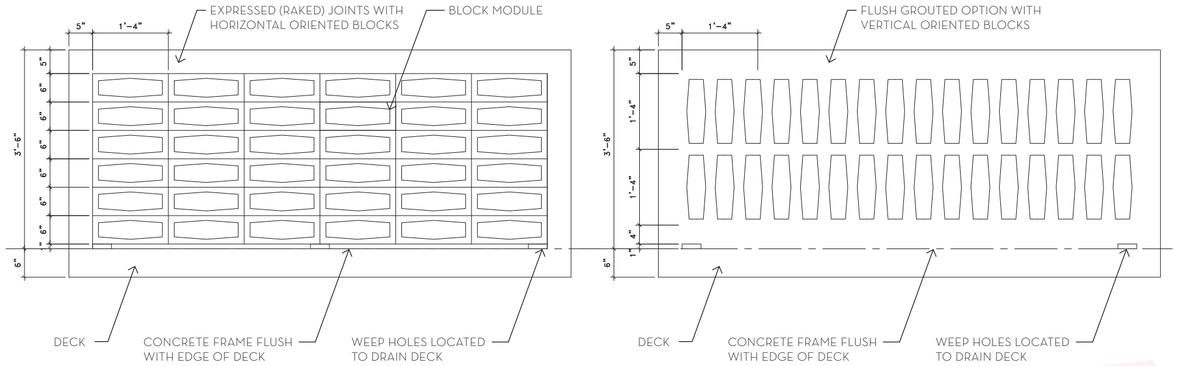
SUITABLE BLOCK TYPES
DESIGN COURTESY OF ABEL BUILDING SOLUTIONS AND E ZEE LAY BRICKS



HARLEQUIN



ARCADIAN

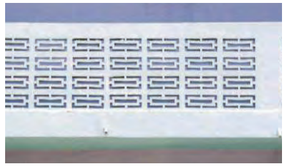


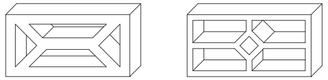
DESIGN STRATEGIES

Ⓓ Modular Concrete Breezeblock: 8" x 16" Type

A more typical block size, 8"x16", not all standard fabricated block patterns are suitable for use in a mid-century designed building. Particular designs have been identified that lend themselves this use, however it would be prefered that the original block design be replicated, available at most block fabricating companies. Accommodating this block size requires formation of a concrete base to maintain the correct thickness for the rail.

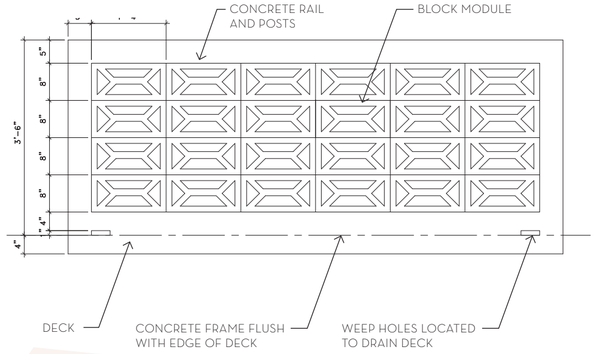
SUITABLE BLOCK TYPES
DESIGN COURTESY OF A1 BLOCK

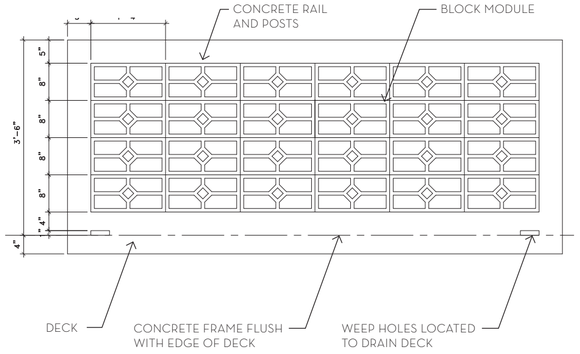




#314

#422





DESIGN STRATEGIES

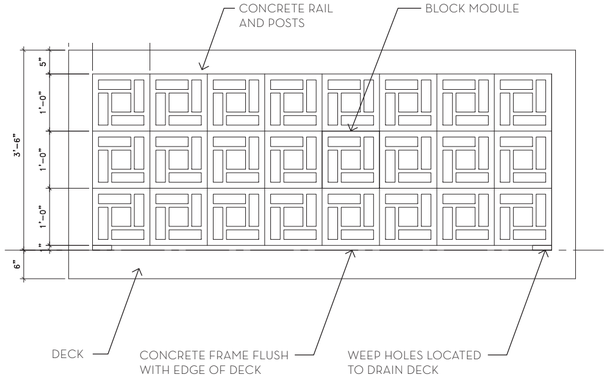
Ⓓ Modular Concrete Breezeblock: 12 x 12" Type

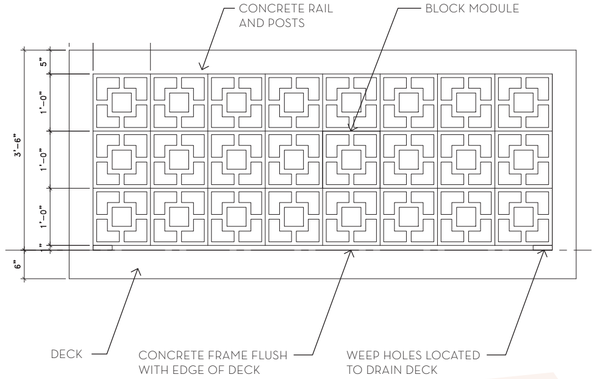
16"X16" blocks are by far the most common mid-century block used for railings. None of the original designs are currently available by standard order, however are available as a custom purchase from most concrete block manufacturers. Ideally, the original block pattern should be utilized, but suitable substitutes may include the designs below. These block sizes are very suitable for forming a 42" high balustrade.

SUITABLE BLOCK TYPES
DESIGNS COURTESY OF A1 BLOCK

#501

#397



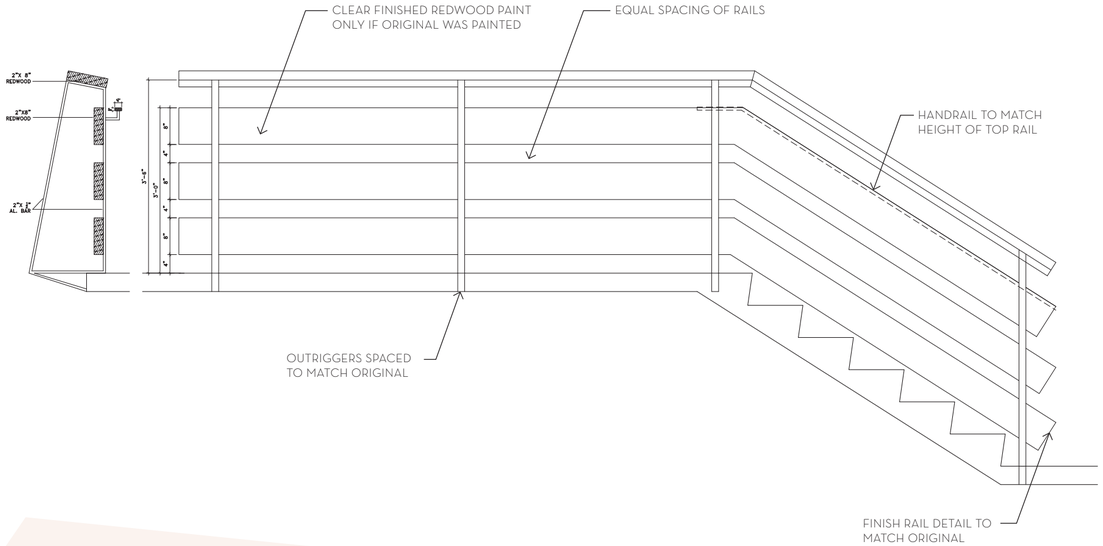


DESIGN STRATEGIES

E

Wood and Metal 1

This very unique design illustrates the strong relationship between the railings and the outriggers often employed to stabilze these very slender posts. While slightly more tightly spaced, these railings are generally able to maintain a lot of their original proportions while meeting current codes.

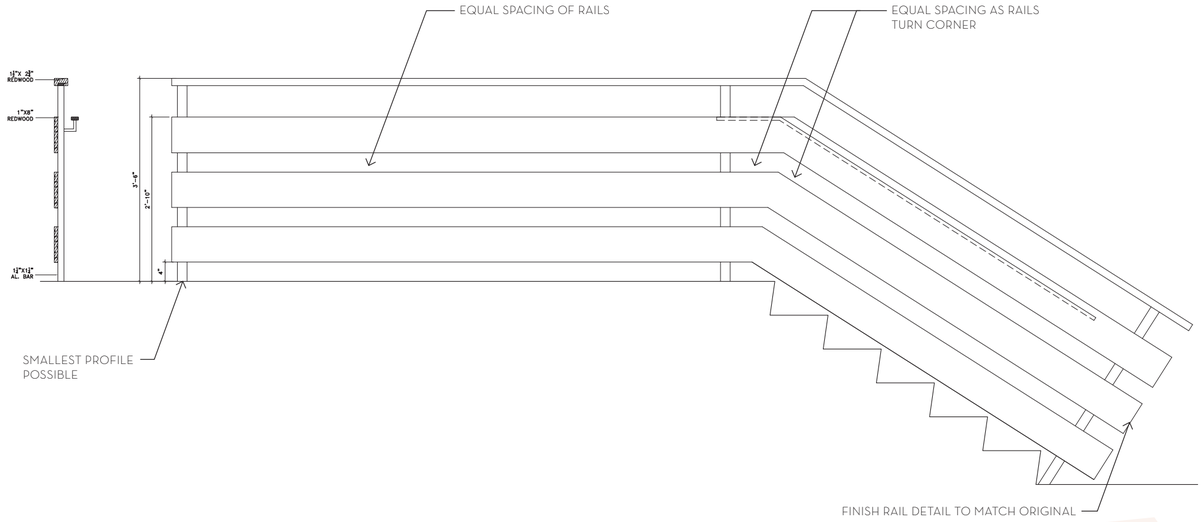


DESIGN STRATEGIES

E

Wood and Metal 2

A more simple version incorporates a standard embedded post design, but illustrates some of the detail options such as the angled termination of the railings at the base of a stair. This design also lightens the density of the rail by maximizing the allowable opening between the top of the 34-36" rail and the top of the guardrail.

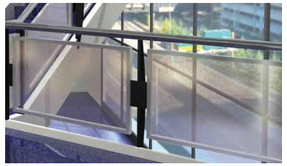


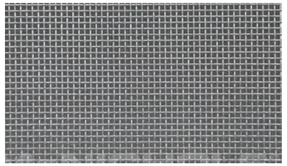
DESIGN STRATEGIES

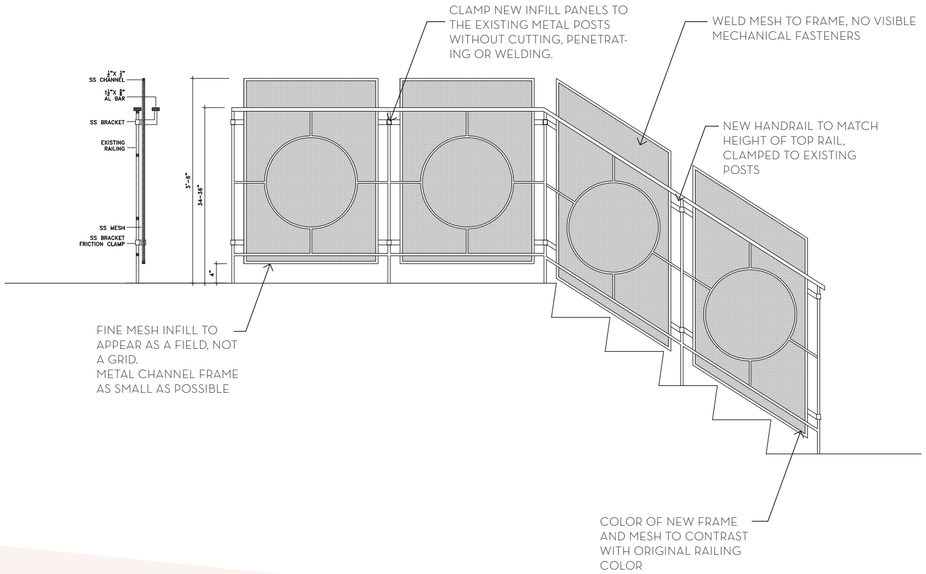
F

Adaptation of Original with Mesh Behind

The priority of adapting the original railing should be to retain in its entirety the original railing, and add as little new material to achieve current code compliance. This solution proposes a transparent field of panels behind the existing, in a contrasting color, so that the original and the new can be clearly identified.





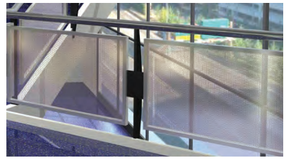


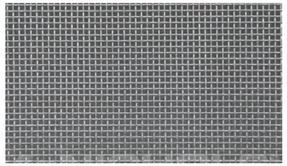
DESIGN STRATEGIES

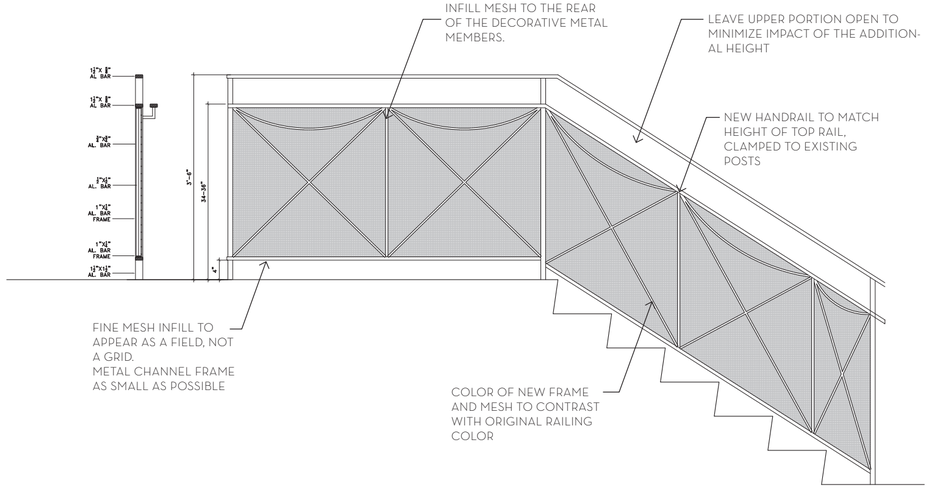
G

Adaptation of Original Design with Mesh Incorporated

This example is proposed for original designs that are difficult to modify without losing the intent of the design, and where replacement is required because of deterioration or structural inadequacy. The new railing should incorporate the correct proportions for the metal members, and the 4 inch rejection requirement is achieved via a metal mesh attached discretely behind the decorative members. The mesh should be a contrasting color from the railing members.







1 STEEL/WROUGHT IRON

A Restoration

I. Identification of Damage

Ironwork suffers deterioration which must be identified and treated effectively as early as possible. The most common of which are corrosion, structural damage and poor previous repairs.
Corrosion is the formation of iron oxide (rust) by the reaction with oxygen and water, and begins at breaks in the surface of protective paint. Prevention of water penetration and retention is therefore a vital aspect of rust prevention. In addition, corrosion can occur where two different metals are in contact with each other. If affected areas are not treated as soon as they occur then rust can move across the railing, causing damage to attachment points such as cracking stucco and concrete, and staining adjacent materials.

II. Metal Repair

Surface preparation in order to repaint should include the following steps; removal of old paint, removal of rust, removal of loose flakes, called 'mill scale' and removal of dirt, dust, soluble salts and other substances.
Only paint that is loose, perished or flaking must be removed unless areas of existing paint are also hiding details in the metalwork, or transitions between old and new are visible after repainting. Areas of existing paint in good condition may be cleaned and repainted with two coats of paint suitable to the substrate.
The use of mechanical, especially dry high speed abrasive tools should be avoided because of the risk of inhaling lead dust contained in old paints. Paint striped may be used, but must be removed from the surface as per manufacturers' recommendations before repainting. Hot air blowers may also be used however care should be taken since localized overheating can set up thermal stresses in the metal. A suitable cleaning method should be identified based on the type of metal being cleaned, the amount of detail and the condition of the railing.
Loose and defective mill scale can be removed by abrasive action helped if necessary by the application of heat.
Removal of small areas of rust may be completed with abrasive action and treated with a chemical converter. Deeper affected areas may need repair with metal fillers after the removal of the rust, or in severe cases sections may require replacement.
Most cleaning methods are likely to cause parts to become dislodged, or other structural damage. Care should be taken to avoid such further deterioration. A thorough inspection of the cleaned ironwork should be completed prior to any preparatory coatings or paint being applied to the metal.
If possible, existing railings should be galvanized for additional protection, and to reduce the amount of cleaning/painting maintenance required for their upkeep.
New paint coatings must be compatible with the existing paint. It is important to maintain a continuous paint layer, typically by applying several layers to prevent 'pin holes' or thin areas of paint coinciding in all layers. Painting must be done regularly and effectively, ideally at least annually. Painting over rust is a waste of time and money, since the corrosion continues under the surface. The above steps must be completed in their entirety for an effective solution to further deterioration. In addition, ironwork which has been continually painted over will lose any detail, so it is recommended that old paint is removed and replaced.

B Replication

Should replication in wrought iron be the chosen method of railing replacement, new ironwork design and fabrication details should match the original railings in every possible manner. Connection details to the walls, spacing of posts, spacing of spindles, profiles of the handrails, connection methodology of the various railing components, and component profiles should match.
New wrought iron railings can be additionally protected with galvanizing, reducing the need for the same amount of maintenance as required for an existing wrought iron railing.

RESTORATION/FABRICATION METHODOLOGIES

C Installation

Embedment of new railings or reinstallation of repaired railings into the concrete deck should ideally be completed with attachments in the same locations as the original railing. This will require re-coring of the existing post holes. Re-core the slab, providing a hole wide enough to accommodate the new railing without any contact between the post and the existing concrete. Should any rust or deterioration be noted in the existing rebar, concrete remediation should be performed to industry standards for concrete restoration.
The bases of the steel posts shall be galvanized and powder-coated to standards as noted earlier both inside and outside to a minimum height of 3" above the finished concrete deck.
Posts shall be set in non-shrinking grout. The grout shall be positively sloped away from the base of the post and shall be at a minimum, level with the finished deck level to avoid any water ponding against the posts.
The entire deck should be waterproofed in accordance with industry accepted guidelines to avoid water intrusion into the grout.
If new post holes are to be cored into an existing slab care shall be taken to avoid coring through rebar.
If railing is to be attached to a newly poured concrete deck, post holes should be located and formed using a grout pocket form to avoid later coring of rebar in the deck.

2 ALUMINUM

A Fabrication

Although not the preferred methodology for replacement of the railings, aluminum has proven to be a popular choice for railing replacement given its enhanced ability to withstand the salt air environment, and lower maintenance requirements. It must be understood, however that aluminum is a much softer metal, and much easier to damage via bending and impact. For this reason, a life cost analysis may prove that aluminum is not the best solution.

Aesthetically, aluminum runs the risk of not being a suitable solution for replacement railings, since typically larger profiles are required to achieve the same structural performance. Where possible, solid bar stock should be considered in order to minimize member sizes in order to more closely replicate the original designs. In addition, solid bar is more suited to curved shapes since rolling does not kink the material, often a problem for tubular members. For tube profile posts and rails, a thicker wall thickness may allow for a much smaller cross section.

Replacement railings shall be engineered to comply with all current required structural loads and shall allow for the appropriate thermal expansion. Railings shall be fabricated from all new metals free from pitting, seam marks, roller marks, stains, discoloration and other imperfections, and different metals shall be appropriately insulated from one another to prevent corrosion.

All connections must have a four sided weld, with no exposed mechanical fastenings. Concealed fasteners should only be used for interconnecting railings components and for attachment to other work. All fasteners must be of the same material as the railing. All connections must maintain the structural integrity of the whole, and all railing ends must be closed. Weep holes should be provided when necessary to provide condensate moisture to escape.

The design should allow for the railings to be preassembled to the greatest extent possible to minimize field splicing and assembly. Field measurements should be carefully taken to eliminate the need for cutting, welding or abrading of the railing during installation. Installation in the field should incorporate the bare minimum fully concealed fasteners, and the resulting joints should be flush, smooth, rigid hairline joints.

Aluminum railings should first be pretreated then receive a baked-on painted finish. Anodizing is not recommended for welded railings due to the likelihood of discoloration.

B Installation

Embedment of new aluminum railings into the concrete deck should ideally be completed with attachments in the same locations as the original railing. This will require re-coring of the existing post holes. Re-core the slab, providing a hole wide enough to accommodate the new railing without any contact between the post and the existing concrete. Should any rust or deterioration be noted in the existing rebar, concrete remediation should be performed to industry standards for concrete restoration.

The bases of the aluminum posts shall be powder-coated both inside and outside a to minimum height of 3" above the finished concrete deck to avoid interaction between the aluminum and concrete.

Posts shall be set in non-shrinking grout. The grout shall be positively sloped away from the base of the post and shall be at a minimum, level with the finished deck level to avoid any water ponding against the aluminum.

The entire deck should be waterproofed in accordance with industry accepted guidelines to avoid water intrusion into the grout.

If new post holes are to be cored into an existing slab care shall be taken to avoid coring through rebar.

If railing is to be attached to a newly poured concrete deck, post holes should be located and formed using a grout pocket form to avoid later coring of rebar in the deck.

3 CONCRETE; PRECAST AND BREEZEBLOCK

A Restoration

Precast and breezeblock railings appear to have the best longevity of the Mimo railings, with the majority intact,. However, insufficient concrete coverage of reinforcing bars has often caused spalling of the concrete railings and posts,and some blocks have received impact damage and the broken blocks have been removed.

Cleaning and concrete repair work both of the deck and the railings themselves should aim to remove all rusted reinforcing bars, and new reinforcing doweled in and correctly covered to industry standards. All concrete elements should be kept at the same depth and width as the original, unless less than 4" in any direction, which then does not provide sufficient coverage of the rebar.

While the majority of the block and precast baluster designs are no longer in production, some local CMU fabrication companies are capable of creating a mold of the original block and can create exact copies of the original. Depending on the amount of block to be replaced, this replication process can result in a less expensive solution if the alternative is to demolish and replace all existing blocks. New blocks can also be slightly modified where appropriate to enable compliance with current codes. If weight is an issue, lightweight concrete may be investigated as an alternative.

B Replication/Replacement

Where all blocks or precast panels are to be replaced, a mold of the original should be made, or a similar code compliant block sourced. Units should be reinforced, tied or anchored as appropriate for each type of block and the size of the opening. Grout joints should either be raked and expressed, or fully buttered and flush, to match the original design. New concrete railings and posts should match the existing in proportion and be cast in place to avoid expressed joints resulting from piecing together using precast components.

Precast balustrades consist of the baluster, post and rail. Balustrades should be appropriately attached to the deck to meet structural requirements by drilling of the deck to accommodate rebar mortared into the deck and baluster with Type S mortar or sanded grout, depending on the joint size.

The top of railings should be slightly pitched toward the deck to provide positive drainage to the surface and prevent ponding and water damage. Regular weep holes coordinating with the deck slope should be installed to prevent water ponding against the base of the units and rusting the rebar doweled into the baluster.

All block and precast units should be painted as per the original design where applicable.

C Protection and Maintenance

Railings should be regularly checked for cracks and chips to prevent water intrusion and rust developing in the rebar.

RESTORATION/FABRICATION METHODOLOGIES

4 WOOD

A Restoration

Most original wood railings have extensive damage, and so few will be suitable for pure restoration. Original redwood slats should be stripped of all paint, while protecting the wood beneath, unless original documentation of the railings demonstrates that they were originally painted. Only those portions showing damage should be replaced, and entire pieces should be replaced, not spliced with a new board. The grade of all replacement pieces should match those adjacent, with the same species and the same amount of grain, figure, texture, color and cut.
Refer to Steel section of these guidelines for restoration of the metal elements of these railings.

B Replacement

All new wood shall be in proportions to match the original.
Re-housing into structure: See Aluminum or Steel sections.

C Protection and Maintenance

Regular stripping and re-coating is required to retain the original natural wood.

D The use of new redwood is strongly discouraged to prevent the potential future loss of these ancient trees. Alternative wood types resistant to weather such as teak, mahogany or cedar should be considered.

APPENDIX A – DISCLAIMER

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About

This Design Guideline is published by the City of Miami Beach for a community education project that has been financed in part with historic preservation grant assistance provided by the National Park Service, U.S. Department of the Interior, administered through the Bureau of Historic Preservation, Division of Historical Resources, Florida Department of State, assisted by the Florida Historical Commission.

CREDITS
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FUNDING
This project Post-War Modern/MiMo Design Guidelines has been financed in part with historic preservation grant assistance provided by the National Park Service, U. S. Department of the Interior, administered through the Bureau of Historic Preservation, Division of Historical Resources, Florida Department of State, assisted by. the Florida Historical Commission. However, the contents and opinions do not necessarily reflect the views and opinions of the Department of the interior or the Florida Department of State, nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Department of the Interior or the Florida Department of State. This program receives Federal financial assistance for identification and protection of historic properties. Under Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975, as amended, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, age, national origin, religion, sex, disability, or sexual orientation in its federally assisted programs. If you believe you have been discriminated against in any program, activity, or facility as described above, or if you desire further information, please write to: Office of Equal Opportunity, U. S. Department of Interior, National Park Service, 1849 C Street, NW, Washington, DC 20240.