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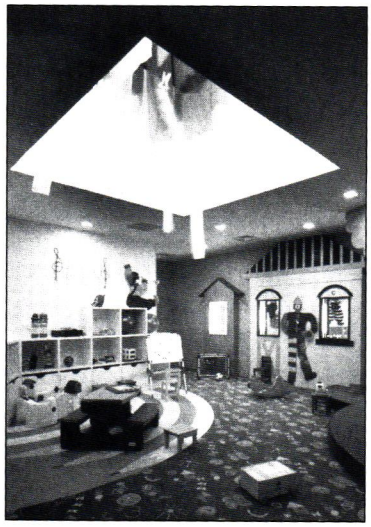

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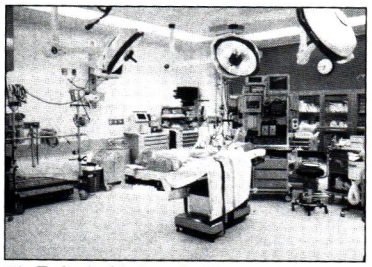

10 Today's Choices for Tomorrow's Needs

IN THIS ISSUE ...

The articles in this issue of *Hawaii Pacific Architecture* are written by different authors but stress the same theme – technology in the medical profession is constantly changing, so technological innovations must be taken into consideration in medical project design. Articles on Hawaii facilities including Kaiser Permanente, Rehabilitation Hospital of the Pacific, One Kalakaua Senior Living and Tripler's VA Ambulatory Care Clinic are supplemented by a study of the Kameda Clinic in Japan designed by Architects Hawaii.

COVER: A graceful watercolor rendering of the VA Ambulatory Care Clinic demonstrates how well the facility will complement the signature colors and design of Tripler Army Medical Center.
Rendering by Carter Black

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Japan's Kameda Clinic sets a new standard in medical facility design

Continuing a Legacy

by Walter H. Muraoka, AIA

Children forget they are at a medical facility when they enter this colorful playroom.

The Kameda family of Kamogawa-shi, Chiba Prefecture has a long history as health-care pioneers in Japan. Eleven generations ago a Kameda studied Western medicine from the Dutch. Today there are four Kameda brothers who are physicians and heirs to this unique legacy of introducing improvements to Japan's health care delivery system.

The Kameda brothers retained Architects Hawaii Ltd. (AHL) in 1988 to prepare the first American-style master development plan for their existing hospital, Kameda Medical Center. AHL and Herman Smith Associates, an American health care consulting firm, completed a long-term facility master development plan for this 760-bed hospital in 1989. The clients immediately saw the value of having a facility master plan to work in concert with providing high-quality health care in a cost-effective and caring environment.

Kameda Medical Center plays a dominant role in the city of Kamogawa, which has a population of 30,000 people. Because the hospital has a reputation as a high-quality care provider, it attracts patients from neighboring towns and the Tokyo region. Kameda's standards also have to meet American expectations because it serves U.S. military personnel from Yokosuka Naval Base and Yokota Air Force Base.

Excellence Despite Obsolescence

Despite its excellent reputation, the facilities were unable to handle the workload. Outpatient and inpatient traffic inter-mixed throughout the hospital. Additions and renovations had been made only to resolve immediate problems without considering long-term implications.

The Kameda brothers realized that having a master plan gave them a logical way to renovate their facility. They established priorities for key projects, allowed for changes in technology, set project schedules and had better control over expenditures.

Plan implementation began immediately. Phase I was a 500-car parking structure. Before the structure was completed, there was no organized parking for the hospital. The parking structure is believed to be the first of its kind for a hospital in Japan.

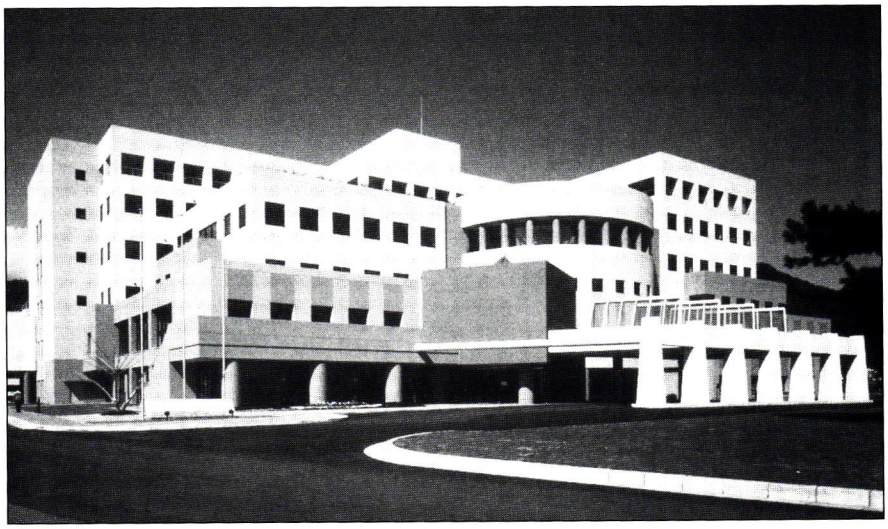
The striking lobby of the Kameda Clinic provides a strong design element.

Phase 2 was a new service building which included a new central plant, receiving area, loading dock, materials handling facility, clinical laboratory and food service facility. This building allowed vacated spaces in the existing hospital to be renovated for other services and demolition of several free-standing structures that were no longer useful.

An Innovative First

The Kameda Clinic, a new 240,370-square foot outpatient clinic, was dedicated in April 1995. This building represents the first of its kind in Japan – an outpatient clinic completely separate from the hospital. It was demonstrated during the planning process that a free-standing center would be the best choice. Major reasons included:

- projections for a 50 percent increase in daily outpatient visits (to be over 3,000 outpatient visits per day),
- increased efficiency by only serv-



The Kameda Clinic has quickly become a local landmark.

ing outpatients,
- proximity of the parking structure, and
- use of the area vacated by the existing outpatient clinic for future inpatient care expansion.

In 1991, AHL began to plan and design the clinic. The clients clearly stated their design goals:
- The building must be a landmark, easily recognizable by patients and visitors.
- Obvious wayfinding – patients should easily find their way through the facility.
- The design should allow medical professionals to handle increased capacity without reducing quality of care.
- The interior design should be non-threatening, allowing patients and family members to feel welcome in a healing environment.
- The design should reflect the local culture and environment.
- The design should accommodate state-of-the-art health care technology.
- The design should be able to accommodate future patient load technology improvements.

Prior to the commencement of the schematic design phase, AHL prepared a design palette report. The report made recommendations on design guidelines for the entire medical center complex to unify exterior and interior design images for existing and future buildings.

Karen Muraoka, lead interior designer, developed the interior design around a series of themes. Kameda Medical Center had a new logo designed using the family name *kame* (turtle) and *da* (field). The design is a turtle shell divided into seven sections or fields; within each field is an element representational of the region and associated with a color. The designers concluded that these seven images and colors could become the basis for a series of themes that could achieve design goals: wayfinding, patient-friendly design, and respect for the local culture and environment.

The interior design proceeded on the basis of implementing the themes represented in the new logo. Colors, finishes, patterns, fixtures and furnishings were selected by the AHL team.

AHL worked closely with the clients and Japanese architects and contractors to develop the design and plans. The process that evolved was a blend of Japanese and American design and planning features that resulted in unique design solutions.

The six-story building was designed around a four-story high atrium. The atrium serves as a central wayfinding design element, with escalators and clinic reception stations readily visible at each level. The first four floors contain all outpatient clinics and the pharma-

cy, administration, diagnostic imaging and same-day surgery. The two upper floors include rehabilitation medicine, occupational medicine and a *Ningen-Dock* program. *Ningen-Dock,* or human dry dock, is a health program unique to Japan. Employees from large corporations are given an annual three-day health assessment while staying at a health care facility which provides meals and health education programs. The program includes hotel-like overnight rooms, a restaurant, fitness center and series of classrooms.

During the purchasing stage, the yen was exceptionally strong in comparison to the dollar. This provided an opportunity to procure American-made products such as wall coverings, flooring materials, light fixtures and furniture that were not available in Japan but had a proven track record in American health care facilities.

Goals Successfully Met

The Kameda Clinic was dedicated and fully functional in April 1995. A post-occupancy evaluation was conducted recently to survey staff and patients on the design goals. The evaluation indicated the following:

1. The building is an easily recognizable landmark. Patients and visitors quickly recognize the building and have commented that it does not look like a typical Japanese medical facility.

2. Wayfinding throughout the building is clear and obvious. The atrium and escalators are strong wayfinding elements as are the design themes of colors, symbols and artwork.

3. The new design – along with new electronic technology – has greatly improved staff efficiency. Patient waiting time has decreased significantly. The design and technology will allow the patient load to increase without decreasing quality of care.

4. Patients and their families have complimented the interior de-

MASONRY

HIEHIE

Hiehie. Hawaiian for "to beautify, make distinctive, elegant, distinguished in manner or appearance." Perfect words to describe the functional and aesthetic benefits of masonry. Concrete, brick, marble, stone — the materials of masonry endure time and wear with dignity and beauty. Masonry structures also are quieter and far easier to maintain than wood. In a word, there's really only one choice. Masonry. And that's a truth you can build on.

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sign. The design is unlike other Japanese outpatient clinics – the colors, furniture, lighting and artwork provide a relaxing atmosphere.

5. The interior design and artwork reflect a close tie to the local environment and culture.

6. State-of-the-art technology was installed throughout the clinic. From the moment patients register, are examined by physicians and undergo treatment, their medical history and data are stored on software developed by the Kameda brothers. Patients' confidence is bolstered by the knowledge that they are being served by the most current technology available.

7. The staff believes that improvements made to scheduling, patient medical data transmission and design give the clinic the flexibility to accommodate increased patient loads and technological changes.

The Kameda brothers believe the design goals they expressed in 1991 were attained in the clinic design. The building has been visited by hundreds of Japanese health care providers and government officials to see first-hand this unique facility. In April 1997, the clinic received the 1996 Japan Institute of Healthcare Architecture Design Award for excellence in outpatient care facility design.

AHL is currently overseeing the planning and design of a 400-bed inpatient care nursing tower addition at the Kameda Medical Center. The Kameda brothers and AHL are studying innovative solutions in the design of the nursing units, women's health services and surgical suites. The Kamedas continue to seek and provide high-quality care in a high-tech, high-touch environment.

Walter H. Muraoka, AIA, is a principal at Architects Hawaii, specializing in health care architecture. Muraoka is a member of the AIA Academy of Architecture for Health, the Healthcare Association of Hawaii and the American Hospital Association and is the master architect for the Kameda Medical Center.

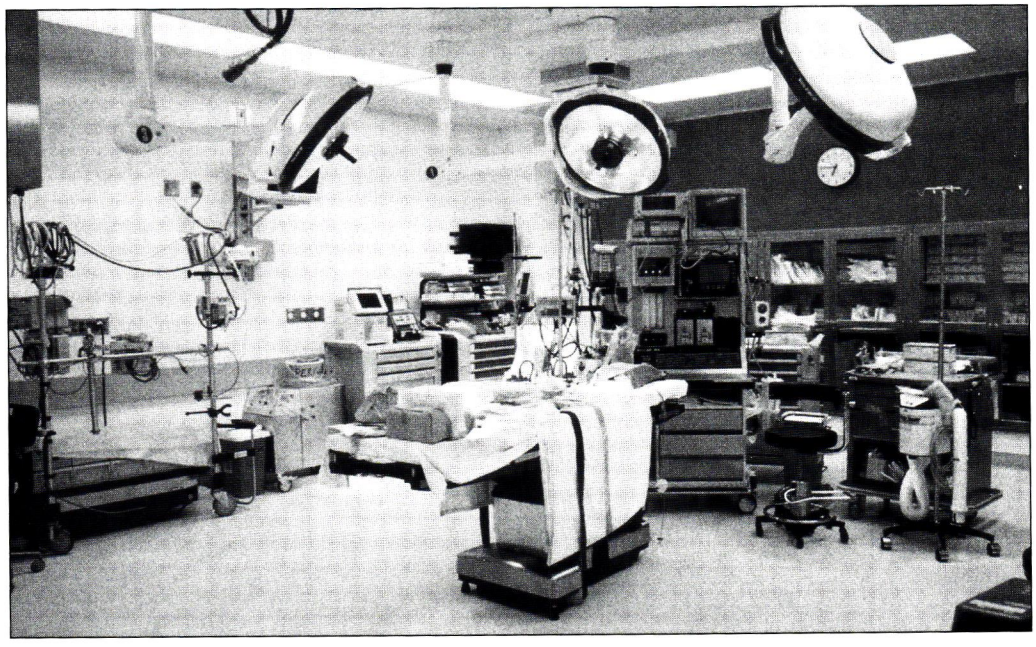
Interior design must reflect technological advances

Today's Choices for Tomorrow's Needs

by Shawn Moynahan

Technology is swiftly advancing in the medical profession. This surge in technological development and intense competition within the industry mean facilities are in a constant state of planning to keep up with new medical techniques. Medical professionals are continually challenged to pinpoint the nature of the industry's practice as little as two years down the road.

In designing interior architecture for the medical profession, flexibility plays a greater role than in any other field. For client Kaiser Permanente, Ferraro Choi And Associates Ltd started the design process by asking the end users – the nurses, doctors and surgeons – for a "wish list." What would their ideal operating room contain? What would the recovery room feature?



The cardiovascular operating room at Kaiser Permanente was designed to adapt to future technological needs.

Photo by Williams Photography

The answers to these questions have a greater role in the medical profession than in the average office project. Planning for adequate emergency power and life safety equipment is a far cry from adding a new fax machine.

The Crystal Ball

The architectural project manager's role in the planning stage is to encourage the client to think of future needs. While these "wish list" items may not be approved or even financially feasible for the current project, knowing what may be on the horizon can put today's renovation in a better position to accommodate those developments.

For example, for a new cardiovascular operating room at Kaiser Permanente, Ferraro Choi met with Kaiser's biomedical group in charge of technical equipment. Together they determined that the infrastructure should feature power and data transmission capabilities substantially beyond current needs. The resulting design contains the most up-to-date equipment available and also has capabilities to support tomorrow's technology.

Beyond technical equipment, designers must also be mindful of special qualifications and restrictions on choice of materials. Not all products are acceptable in a medical fa-

cility. It is important to use appropriate interior finishes. Carpets and upholstery typically need to be vinyl-backed. Some areas even require a medically-approved sheet vinyl in accordance with the type of medical service being provided in the space.

Patient-Based Color Schemes

Even color choice has an importance beyond mere aesthetics. In addition to blood pressure and temperature, skin tone is one of the key indicators in assessing a patient's health. The colors used in the room must remain neutral enough that their tones do not interfere with skin tone assessment. Additionally, color plays an important role in psychiatric wards, where research has proven that certain colors can drastically affect moods.

Ferraro Choi has also found that designing medical facilities often means changes in how the architect relates to contractors. Quick advances in technology and competition among facilities usually put a medical design project on a fast track. This was the case with Kaiser, where general contractor M. A. Mortenson was introduced to the project on the same day as Ferraro Choi. It resulted in a team approach rather than a system of bidding to pre-qualified contractors and created a partnership from the inception of the project.

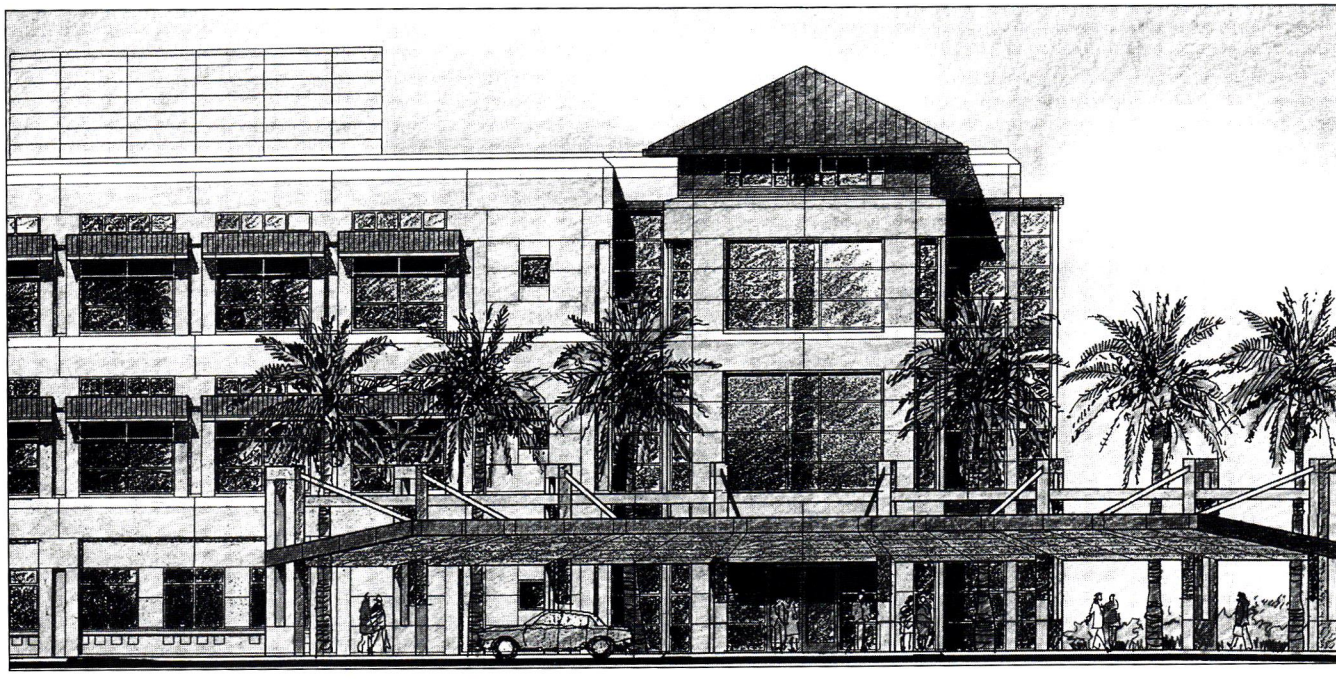
Ferraro Choi has been successful in the medical facilities market because of the ability to build and maintain teams. Flexibility, key in designing for the medical profession, goes hand-in-hand with teamwork. Instead of making assumptions based on past experience, designers and project managers keep open minds and get clients to think beyond the current project. It's allowed Ferraro Choi to be more receptive and imaginative in design, and clients appreciate that.

Shawn Moynahan is a project manager with Ferraro Choi And Associates Ltd, Honolulu, an architecture, interior architecture and research firm.

The Ambulatory Care Clinic at Tripler Army Medical Center

Serving Those Who Served

by Larry J. Bongort, AIA



A canopy provides a protected drop-off area at the main entrance.
Drawing by Doug Shoemaker, AIA

Hawaii has one of the largest per capita veteran populations of any state, yet is the only state besides Alaska which lacks a major Department of Veterans Affairs (DVA) facility. The late U.S. Senator Sparky Matsunaga and Senators Daniel Inouye and Daniel Akaka strongly supported a major DVA facility in Hawaii to better serve the state's veterans. Their vision is now becoming a reality.

The Ambulatory Care Clinic (ACC) at Tripler Army Medical Center is now under construction. Completed, it will be the major free-standing component of the Spark M. Matsunaga DVA Medical Center, which will consist of the ACC, the recently opened Center for Aging, the E-Wing of Tripler and a recently completed parking garage.

Design goals for the Ambulatory Care Clinic were:

- Provide clear and easy circulation and wayfinding for patients.
- Create a distinctive presence while relating the building to adjacent Tripler structures.
- Bring daylight into as many patient spaces as possible.
- Provide long-term adaptability as programs evolve and change.

The site is just ewa of the mauka entrance of Tripler. Working with the program and the site's topography, Architects Hawaii Ltd. (AHL) developed several building massing alternatives, analyzing access, cost, parking, views and expansion options.

The three-story, ell-shaped scheme AHL selected is based on a 27-foot by 27-foot bay. The footprint balances compactness with opportunities to introduce daylight into many patient care areas. Most of the site is preserved for future expansion.

The main entrance is at the outside corner

November 1997

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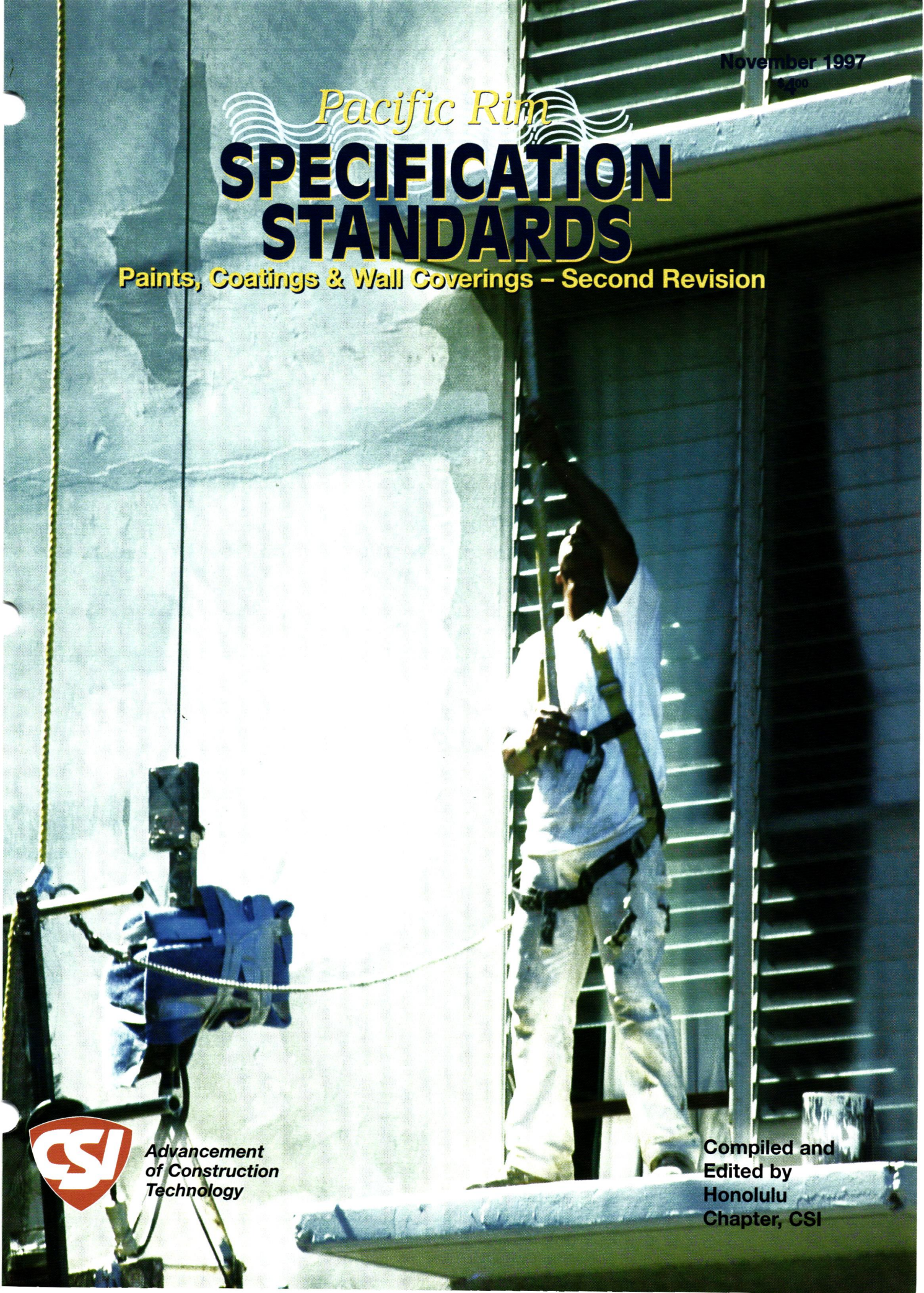
Pacific Rim

SPECIFICATION STANDARDS

Paints, Coatings & Wall Coverings – Second Revision



Advancement of Construction Technology

Compiled and Edited by Honolulu Chapter, CSI

Pacific Rim

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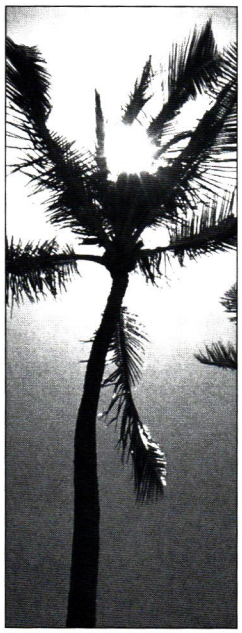

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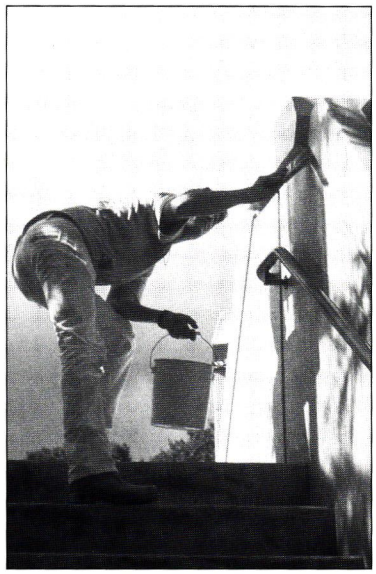


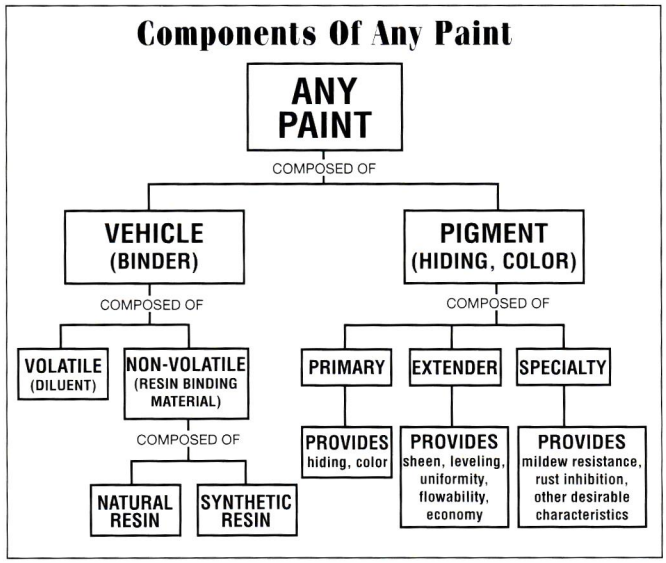
PAINTS

Today's paint industry is a substantial part of the chemical industry and has grown with the demand for protective and decorative coatings. Paint finishes with new and improved properties emerge continually from research labs and production lines. Choosing wisely from these materials requires a knowledge of what is available and where and how these materials and techniques may be best utilized to maintain maximum effectiveness. This specifications standard is dedicated to providing current practical informational needs, philosophies and technologies of finishes related to the unique conditions and methods of construction in Hawaii and the Pacific Rim.

This standard is not intended to cover all available data but to provide a convenient reference source and basic concepts of finishes for building industry professionals. For more information on related products and technology, contact CSI-member product representatives or advertisers in this specification standard.

What Is Paint?

Paint finishes are materials applied as liquids which wet a substrate then cure to a solid, adherent, continuous film (opaque or clear). Many coatings contain as many as 15 or 20 ingredients, each having its own function in overall performance. Higher quality paints generally have a better balance of ingredients. While it is true that both paints and coatings are liquids that cure to solid, continuous films, the differences in use, chemical natures and processes of film formation are distinct. It is generally agreed that coatings are materials applied for their ability to protect a surface and paints are materials applied for decorative purposes.



Paint Composition

Pigments: Provide hiding power, sheen and color to the paint film.

Binders: Bind the pigment to the surface and provide hardness, adhesion and resistance properties to the paint film.

Solvents: Control viscosity, odor and application ease.

Types of Paint

Most paints can be classified according to their binder type:

Alkyd

Synthetic resins with mineral spirits as the solvent. Film formation by evaporation of the solvent and oxidation of the resin. Superior hardness and gloss. Available in various sheens. Suitable for most surfaces except bare masonry or other alkaline surfaces.

Latex

Water-thinned. Synthetic resins that can be made to provide a range of flexibility, hardness and gloss levels. Drying is by coalescence of resin particles as water evaporates from the film.

Advantages versus alkyds:

- better color & gloss retention
- VOC compliance, lower odor
- faster dry and recoating
- water clean-up
- more resistance to UV, mildew, alkali

Vinyl Acrylic Latex (PVA Sealer)

Provides self-sealing properties and will not raise the grain of drywall fibers. Usually interior paints.

Acrylic

Interior and exterior. Most substrates. Superior to alkyd, oil and vinyl acrylic latex paints in color and gloss retention, blister and alkali resistance, early hardness, adhesion and yellowing resistance.

Epoxy Ester

Modifying the epoxy resin with oil allows a single package (catalyst or converter not required) coating that dries by oxidation. Provides better chemical and alkali resistance than alkyds.

Catalyzed Epoxy

Two-component coatings. A base portion is mixed with a hardener or converter to chemically produce an extremely hard film. Once mixed, the paint has a pot life (4 to 16 hours). Available in solvent-based and waterborne products. Outstanding chemical and stain resistance. Suitable for floors due to abrasion resistance. UV exposure will chalk most epoxies (loss of gloss), affecting appearance but not performance.

Oil-Modified Polyurethane

A blend of urethanes, drying oils and alkyds. Drying is accomplished by evaporation of solvent and oxidation of oil. Clear or pigmented coatings offering outstanding abrasion resistance.

Catalyzed Aliphatic Polyurethanes

Two-component packages providing outstanding gloss and color retention, abrasion resistance and chemical resistance. Chemical cure, thus limited pot life.

Fluorothane

Offers unusual surface characteristics, such as superior hardness and chemical resistance and is used primarily as linings for fuel tanks. Application is labor intensive (often four-coat systems) and material price may go as high as $800 per gallon.

Polysiloxanes

The best in color and gloss retention. Available in one and two-component formulations. The combination of features of high-performance epoxy and urethanes offers long-term corrosion and degradation control.

Moisture-Cured Urethanes

One-component materials offering the attributes of two-component polyurethanes, without pot life. Film formation by reaction with moisture (to 99 percent humidity) and applicable on damp surfaces. Fast dry time allows immersion service in 20 to 30 minutes.

Acrylic Elastomers

Long-term flexibility and recovery, with elongation and tensile strength, enable elastomerics to stretch, bridging hairline masonry or concrete cracks. High film build allows waterproofing, even from wind-driven rain, while remaining "breathable," allowing water vapor transmission from under the film.

Gloss versus Sheen

The gloss of a paint is measured with a 60 degree glossmeter (60 degrees from vertical and 30 degrees from the surface). Sheen is measured using an 85 degree glossmeter (85 degrees from vertical and 5 degrees from the surface). The gloss or sheen of a paint does not influence the light reflectance value of a color, which is a function of color only.

What Does "Quality" in Paint Mean?

Paints offering the best all-around satisfaction have the best balance of desirable qualities. Quality in paint, as judged by the consumer, is based on these points:

Durability

Long after application, premium paints must last and maintain appearance when repeatedly cleaned.

- Stain Resistance
- Scrub Resistance
- Burnish Resistance
- Washability

Hiding Ability (Wet and Dry Film)

Preventing the transmission of light through a paint film to the substrate and out again "hides" the substrate from our vision.

- Amount of titanium dioxide pigment
- Thickness of the product applied

Easy Application

- Flow (uniform thickness)
- Leveling (absence of brush marks)
- No splatters, sags or drag

Coverage

- Number of square feet per gallon of paint
- Wet film thickness and dry film thickness (mils)
- 1 mil = 1/1000 inch

- DFT = (1604)(Solids by Volume) ÷ square feet per gallon coverage
- DFT ÷ WFT = Solids by Volume

Appearance

- Flow (uniform thickness)
- Leveling (absence of brush marks)
- Sag resistance

Blocking Resistance

- Residual tackiness that causes painted windows to stick shut.

Wet Adhesion and Moisture Resistance

- Ability to remain adhered to a surface when it becomes wet from washing or exposure to condensation.

Performance attributes are graded by ASTM testing and given "Pass/Fail" or "Good/Excellent" ratings and numerical test values. The length of satisfactory service the paint gives before repainting is important. The paint's performance should meet label/literature claims.

VOCS AND ARCHITECTURAL PAINTS

Paints and VOCs have become a discussion point within the paint industry. Growing pressure to be more environmentally responsible has had a positive effect on both manufacture and application.

VOCs or "volatile organic compounds" in paint are the petroleum solvents. Solvents are used, even in water-based paints, to incorporate insoluble in water pigments, UV absorbers or light stabilizers. Glycol may be used in water-based paints to retard drying. When VOCs are released into the atmosphere and allowed to react with nitrogen oxide smog results. Burning eyes, breathing problems and headaches are signs of sensitivity to VOCs.

Spray painting and roller application allow paint, in volume, to be applied to a surface (increase in surface area of emissions), thus generating greater concentrations of emissions. Paint is a safe product if used following the manufacturer's printed instructions and precautions. VOCs are measured in both grams per liter and pounds per gallon. The proposed 1999 EPA limit for flat coatings is 2.08 pounds per gallon. A semi-gloss coating is limited to 3.17 pounds per gallon. Zero and low-VOC paints are currently available in Hawaii.

MILDEW AND PAINT IN TROPICAL ENVIRONMENTS

There is no sure means to eliminate mildew growth. Mildew spores can remain dormant on a surface until climatic conditions permit growth. Mildew needs organic food and moisture – warmth and humidity accelerate growth. Water-based paints tend to provide better resistance than alkyds, and glossy enamels offer greater cleanability than flat finishes. Paint coatings do not cause mildew, and mildew growth is not more common on paint than on other materials.

Post-added mildewcides can provide additional mildew resistance but do not prevent the growth of mildew under all weather and surface conditions. Mildewcide manufacturers make no warranties or guarantees as to measurable effectiveness when post-added to a paint. Do not repaint over a mildewed surface without completely removing the mildew by washing with a solution of 16 ounces of liquid household bleach and two ounces of non-ammoniated liquid detergent per gallon of water. Allow the bleach time to complete the kill and scrub to remove colonies. Rinse surfaces clean with water and allow surfaces to dry before painting. Repainting a mildew-contaminated surface is not always necessary.

SURFACE PREPARATION

More than 80 percent of premature coating failures can be attributed to inadequate or incomplete surface preparation. Coating life depends as much on the degree of surface preparation as it does on the coating selection and application technique. Surface preparation functions are:

- Remove from the surface foreign material that may cause premature coating failure.
- Produce a surface with the required degree of cleanliness that is compatible with the specific coating system.
- Produce the proper surface profile that will provide the necessary wetting for good coating adhesion.
- Remove contaminants such as dust, dirt, moisture, oil, grease, salts, rust, corrosion, mill scale, laitance, efflorescence, mildew and failing paint.

Preparing Block and Concrete Construction

Poured or precast concrete should cure for a minimum of 28 days and block construction should cure for 30 to 60 days

before painting, depending on climatic conditions. The removal of form release agents (oils or waxes), by sandblasting or washing with detergent and water and laitance (thin skim of concrete slurry that floats on top of a slab), by wirebrushing, brush-off blast cleaning or acid etching, is necessary to ensure good adhesion.

The most common exterior paint failure on masonry is peeling and scaling, often caused by painting over heavy chalk or deposits that have not been properly removed. High-pressure power washing is an effective chalk remover, however, a permit is required before directly discharging wash water into stormdrains, per the City and County of Honolulu Stormwater Quality Section (527-6104). (Collecting the waste water and discharging into the sewer system is legal if a permit is granted by the Department of Waste Water Management, Water Quality Division.) The Revised Ordinances of Honolulu lists restrictions on the use of public sewers. Waste water may be directed into the landscaping but must not run off into streams or the ocean.

Preparing Wood Surfaces

Wood surfaces must be clean and dry. Moisture content of 20 percent is too wet to paint.

Sand smooth, dust clean. Scuff-sand hard, glossy surfaces. Seal pine knots with appropriate primer.

Repainting wood requires removal of loose paint, chalk, mildew and other contaminants. Remove loose and deteriorated coatings to a sound substrate. Feather-sand edges of blisters or repair areas in existing paint film. Dust clean.

Caulking may be required to eliminate accumulation of excess moisture in wood substrates.

Preparing Metal Surfaces

The Steel Structures Painting Council (SSPC) has published a series of specifications discussing accepted methods of preparing metal surfaces for painting. The specs are available from most paint suppliers.

Ferrous Metal

All metal surfaces must be clean, dry and free of foreign substances. Cleaning by hand, wire brush, power tools, chemical etching and even sandblasting not only removes rust and unsound matter but forms "pits" and "peaks" in the steel. This "profile" forms an "anchor pattern," enhancing primer and system performance. The profile should be jagged, rather than "peened." Priming should be accomplished on the same day that cleaning and preparation has occurred. Sharp projections, rusted spots and edges may require additional profile and primer "stripe coat" to achieve specified film build.

Galvanized Metal

New galvanized metal is oiled to reduce "white rust." Remove the oils by washing with detergent and water or by solvent wiping. Aged galvanized metal must have oxidation contaminants removed by cleaning or etching. Alkyd paints exhibit a saponification (soap-making) reaction between zinc and the alkyd resin, causing adhesion loss. Latex, acrylic and epoxy paints adhere well to

properly prepared galvanized metal.

Aluminum

Scuff-sand smooth or shiny surfaces and remove oxidation salts, oil and grease. Prime with a specialty product, which may also be suitable for galvanized metal.

Surface-Tolerant Coatings

Certain amounts of rust, grease, oil or moisture may be tolerated by coatings formulated to provide adhesion to surfaces that have not achieved surface preparation requiring commercial blast cleaning. Surface tolerant coatings include epoxies and moisture-cured urethanes, which provide excellent service over less-than-ideal surface preparation. The U.S. Navy maintains an active interest in surface tolerant coatings from both operational and economic standpoints.

Coating Concrete Floors

Surface Preparation

All surfaces must be clean and dry. Profile on bare concrete may be achieved by sanding, grinding or acid etching. The pH must be less than 10. Cracks and voids must be addressed.

A piece of clear plastic taped to a concrete floor for a day will exhibit moisture migration.

Sealers

Penetrating sealers, often epoxies, deeply penetrate bare concrete and provide a supporting system for coating systems.

Intermediate Coats

Floor-coating films are often hard and slick, requiring an anti-slip aggregate to be introduced to an intermediate coat.

Finish Coats

Floor-coating finish systems may be applied once the intermediate coating has properly dried.

Coating Wood Decks

Decking constructed with spaces between boards should not be painted with a film-forming material. Water absorption from the edges and bottom of deck boards will migrate to the surface and cause adhesion failure. Penetrating stains deeply penetrate the wood substrate rather than forming a film.

APPLICATION FACTORS

Humidity – Painting during periods of extreme high humidity (over 85 percent) should be avoided. Moisture-laden air will retard the evaporation of solvents, causing poor gloss uniformity (blushing), sagging and prolonged dry time.

In geographical areas where humidity is low, paints dry more rapidly, which can affect film formation. Waterborne coatings, particularly when applied to porous masonry, are subject to low humidity application problems which can be alleviated by dampening the surface with water or, when possible, painting on the shaded side of the building.

Temperature – Elevated temperatures (90 degrees F to 95 degrees F) decrease viscosity and thin the coating. Reduced hiding ability, runs or sags may result. Accelerated drying will cause a loss of "wet-edge" (incomplete film formation) resulting in brittle films and restricted leveling. Low temperatures and cold surfaces will prolong dry time, resulting in

runs, sags and wrinkles, as well as poor adhesion and early failure. Coatings should not be applied at temperatures below 50 degrees F, although some water-based paint may be used at 35 degrees F and above.

Toxic Metals and Ecology – Today's coatings have eliminated lead and mercury from their formulations. Lead had been used for pigmentation and drying. Biocides without mercury are now added to paint formulations. Solvents for general paint use are manufactured to conform with air pollution regulations.

Spreading Rates – Spread is most affected by:

- substrate texture
- substrate porosity
- temperature
- humidity
- air circulation and ventilation
- degree of thinning
- method of application

Drying Time – Together with film thickness and factors affecting spread, dry time is also influenced by light (natural or artificial), particularly with coatings forming films by oxidation processes, as light catalyzes the reaction. Paints applied in the absence of light may exhibit slower dry times.

Humidity has a pronounced effect on water-thinned products. Water is volatile at low atmospheric humidities, but when humidity is very high, drying time of water-based paints is magnified and poor film formation may result.

Most coatings are formulated to dry to touch within a specified period of time during normal drying conditions. At this point the coatings are considered "dust free." Dust or dirt particles will no longer adhere to the freshly painted surface and light rain will not deform the film. "Dry to recoat," "dry to stack" and "dry to place in service" data is available specifically for paint products. A certain degree of complete film formation must be established for liquids that dry to solid films. Adding additional solvent or water, in the form of a second coat of paint, may trap the solvent within the paint and poor film formation may result.

Allowing a primer to "dry hard" or "reach full cure" may result in a surface too slick and hard to allow maximum adhesion of a topcoat.

Staining and Discoloring of Exterior Coatings –

- Extractive Bleeding: Soluble colored compounds, especially in wood, may be dissolved by a paint's solvent upon application. The compounds produce a stain similar to water leak stains when they migrate to the surface of the paint film. Repainting with a proper primer for this substrate is necessary.
- Rust and Metal Oxidation Stains
- Corrosive Fumes
- Mildew

PAINTING PROBLEMS AND SOLUTIONS

Failures Caused by Excessive Moisture in Substrates – Sources of Moisture:

- collected behind siding (condensation, inadequate ventilation)
- leaky roofs
- inadequate flashing
- loose glazing putty
- separation or absence of caulking
- wicking by on-grade concrete floors
- cracks in concrete or masonry
- concrete spalling

Moisture allowed to concentrate behind a substrate can cause blistering, peeling, stains, rusting, efflorescence and mildew contamination. Use of solvent-thinned paints on some substrates is restricted, as the coatings seal the substrate and will not allow moisture to escape.

When repainting failed areas, consider that the performance of an additional finish coating is no better than the integrity of the previously coated surface.

Blistering and Peeling – When trapped moisture migrates to a painted surface, it will finally make contact with the paint film. Newly applied or elastic paint films will raise as the moisture escapes. Puncturing a blister releases the moisture but leaves an area with adhesion failure. Once a paint dries hard, the loss of elasticity will not allow a blister to form and a crack in the film results. Painting must be done under favor-

able weather conditions. Testing moisture content of suspect substrates is recommended prior to application of most paints.

Prior to repainting, removal of loose and deteriorated coatings from a sound substrate is proper surface preparation. Feather-sanding edges of repair areas or blisters in existing paint film will help repaint appearance; however, some areas may require removal of the coating to bare substrate. Priming may be necessary on bare substrates.

Efflorescence – Moisture, migrating through a concrete, masonry or plaster substrate, dissolves salts in the substrate. Once the surface has been reached and the water evaporates, the salts are deposited as visible white powder (crystal colonies). The source of the water must be located and corrected or the conditions will reoccur. The salts are highly alkaline which makes them great chemical paint removers. Alkalinity may be neutralized by treatment with weak acids prior to reapplication of paint. Gravity and the path of least resistance will allow water migration and efflorescence on building interiors and exteriors.

Rusting – Iron, steel and galvanized metal require the protective function of paint coatings to eliminate the sources, oxygen and water, of the oxidation reaction known as rusting. Zinc, as a paint ingredient or by galvanization, acts as a sacrificial anode and will provide longer rust-free service than untreated ferrous metal. Oxygen and water contact with ferrous metals may be eliminated by providing a barrier, or paint film. Rust, scale and other metal oxidation must be cleaned prior to repainting. Paint performance is proportional to degree of surface preparation accomplished.

Non-Moisture Related Painting Problems – Build-up of multiple coats of old, unsound paint systems may be subject to peeling when repainted, due to the added weight and stress created within the paint layers.

- Knots and other resin-rich areas of wood cause adhesion loss, especially in pine wood. Hot weather and cracks may occur.
- Heat. On warm surfaces or in direct sunlight, the paint film may begin to form at the surface, trapping the paint's own moisture (solvent) within the film. Specially formulated finishes should be specified for substrates exposed to elevated temperatures.
- Inadequate cleaning of surfaces to receive paint coatings.
- Inadequate surface preparation of surfaces prior to painting.
- Selection of the wrong material.
- Improper application of the material.
- Insufficient film build.
- Abrasion, especially in high-traffic areas.
- Chemical corrosion.

Chalking – Sunlight will break down a paint film's binder, exposing the paint's pigment on the surface. Pigment particles are very vulnerable to sunlight and water and will, upon exposure, join the photodegraded polymer particles as chalk. High pigment-to-resin ratio of low-sheen paints may rapidly cause exposure of the pigment. Paint that purposely chalks has been used to provide a clean appearance, washing away (with foreign matter) at each heavy rain.

How rapidly and to what degree a coating chalks depends primarily on amount of UV exposure, quality of ingredients used and formulation of the coating. Heavily-chalked surfaces offer limited adhesion of paint films. Cleaning the surface of heavy chalk by broom cleaning, sanding and dusting or washing is recommended prior to painting.

Specialty primers are able to get past chalk and "wet" the substrate, thus gaining adhesion of the film to the substrate.

Concrete Floors – On-grade and below-grade concrete and masonry absorb groundwater. Moisture migration to the surface will lift paint from the floor. If the source of the moisture can't be eliminated, a coating that does not form a film on the surface should be recommended. Concrete stains penetrate into the floor and provide color and function; they do not form a film on the surface. Painting over a contaminated or wet surface will cause peeling of floor paints, as will painting over a hard, smooth, glossy surface (i.e., bullnose of concrete stair tread). Proper cleaning and surface preparation are essential.

Problems Relating to Faulty Application Practices

Alligatoring

Cracking of a film into alligator skin patterns, caused by

application over an undercoat that has not dried sufficiently or an undercoat too "soft" for a hard-drying topcoat.

Wrinkling "Orange peeling"

A film applied thickly can dry at the surface but with the under surface remaining wet. In time, the solvent will evaporate but the film remains stretched and will wrinkle.

Poor Hiding

Too much surface and too little paint. Film thickness and amount of pigment remaining provide hide. Additional topcoats may be required to provide sufficient hide when using some colors. Titanium dioxide has the best hiding power of the white pigments because of its ability to scatter light.

Flashing

An unsealed substrate absorbs liquids more quickly than a hard or sealed surface. Porous areas may exhibit a dulling of the film in that area. Temperature and humidity affect gloss during film formation.

Lap Marks

Inadequately-sealed surfaces. Conditions promoting loss of "wet edge" so that at the edge, where the application technique overlaps, an additional coat of paint results. Applying too little paint.

HEALTH AND SAFETY SPECIFICATIONS

When involved in renovating structures, architects must address numerous tasks and operations. The health and safety of workers, the public and the environment must be considered when a structure undergoes architectural change.

Safety and Health Hazards

Qualified construction contractors and their employees should be aware of safe practices with tools, equipment, utilities and structural shoring. Project specifications should identify potential hazards associated with the project and require contractors to comply with applicable construction health and safety standards. Safety must also address hazardous materials and chemicals that may be encountered.

Sources of Regulations

OSHA Standards are found in the Code of Federal Regulations (CFR) Title 29. 29 CFR 1929 contains the Construction Industry Standards. General Industry Standards are found in 29 CFR 1910.

In addition to physical hazards, both standards address specific hazardous agents, such as noise, gases, vapors, fumes, dusts and mists. Those of current concern in existing structures are lead and asbestos. Hawaii has state OSHA (HIOSH) regulations which must be at least as stringent as the federal requirements to obtain federal approval. Revisions to include new Construction Industry Interim Standards for lead are called EPA Title X.

EPA and state regulating agencies establish rules for waste disposal from production and construction operations. Surfaces and wastes containing asbestos and lead are subject to special testing, handling and disposal requirements. Hawaii currently doesn't have a separate state regulated approval program for hazardous waste; federal regulations apply. Identifying applicable regulations in project specifications will alert potential contractors to compliance requirements. This is important, as the structure's owner is legally responsible for any and all hazardous waste generated during the project. Improper handling and disposal can result in fines and imprisonment.

Hazardous Materials and Substances

The agents used most in building rehabilitation are asbestos and lead. Asbestos exposure can result in debilitating pulmonary disease. Inhaling airborne asbestos fibers causes lung scarring and permanent damage. Ingesting lead can cause kidney and neurologic damage. Transformers, capacitors or ballasts may contain PCBs, associated with tetragenic, mutagenic and carcinogenic change in laboratory studies. Other hazards may include acids, caustics, raw materials, waste and drums.

Abating Hazards

Identified hazards require that they be addressed as part of the project's specification. It may be appropriate to prepare a separate specification to address their removal from the structure. Significant amounts of available literature detail the operational aspects of asbestos abatement (OSHA, EPA) and lead abatement (OSHA, EPA, HUD).

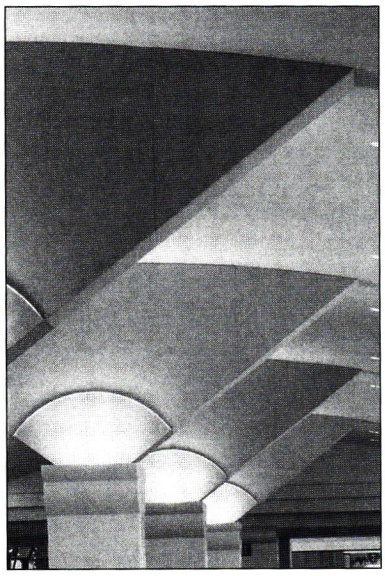
TRANSPARENT COATINGS AND STAINS

Clear finishes protect without obstructing the view. Interior and exterior semi-transparent stains are formulated to penetrate into a surface, allowing visibility of wood-grain pattern and wood or concrete texture to remain. Stains or sealers containing a higher volume of solvent (thinned) are able to penetrate more deeply into the surface. Once a surface has been sealed, penetrating sealers are not recommended. Some semi-transparent stains require clear finishes.

Solid-color stains hide the grain pattern and color of wood. Formulated with fewer solids by volume than paint, the solid-color stain film will highlight the natural texture of wood. Solid-color stains should be used over a proper prime coat. Both semi-transparent and solid-color stains are manufactured in water-based and solvent-based formulations.

Clear finishes may also be solvent-based or water-based. Varnishes, urethanes and acrylic-urethanes are the most common clear finishes. Water-based clear products provide exceptionally clear finishes and polyurethanes offer resistance to solvents (alcohol) and better yellowing resistance than varnishes. Clear finish resins are susceptible to UV photodegradation and will not protect the surface from sunlight. Clear finishes over coatings that chalk with UV exposure will not adhere to the chalk and clear-finished wood will weather to the silver-gray color. Additives such as light stabilizers and UV absorber packages will provide longer protection, but clear coatings require maintenance. Multiple thin coats will provide better appearance and protection.

Sanding sealers allow production of a very smooth surface for the finish clear film. Varnishes are used to topcoat sanding sealers containing sterates. Do not topcoat sanding sealers with polyurethane finishes.



WALL COVERINGS & SPECIAL COATING SYSTEMS

TYPES OF WALL COVERINGS

VINYL WALL COVERING: Vinyl wall coverings are washable, more durable than paint and last up to four times longer. For stain resistance, Dupont's "Tedlar" coating is a thin sheet of polyvinyl fluoride (PVF), factory-laminated to the wall covering. Common stains cannot penetrate PVF laminate films, although some stains leave a ghosting residue. The wall covering surface luster is brighter and grain detail can be subdued.

Acrylic coatings delay but do not prevent the penetration of common stains. Clean these wall coverings promptly or stains will migrate through the finish and permanently stain the vinyl. Do not use solvent-based products.

There are a variety of stain-resistant finishes available from specific manufacturers. These may not be as effective as "Tedlar" but can improve the stain resistance of a wall covering for less expense.

Two major standards pertaining specifically to vinyl wall covering are FS-CCC-W-408A and CFFA-W-101-A.

CFFA-W-101-A defines three types of wall coverings based on tests similar to those used in FS-CCC-W-408A. FS-CCC-W-408A is superseded by later versions FS-CCC-W-408B and C. The amendments resulted in what many consider a less stringent standard. The earlier "A" version is the one referenced by most manufacturers. It sets criteria for abrasion resistance, cracking, colorfastness, cold cracking, heat aging, hydrostatic resistance, and shrinkage. FS-CCC-W-408A defines three types of vinyl wall covering:

Type I, Light Duty usually has a non-woven or scrim backing. They offer moderate protection from abrasion and wear. Appropriate uses are offices and hotel rooms in areas not subject to unusual abrasions or heavy traffic.

Type II, Medium Duty usually has an Osnaburg, Drill or non-woven backing. These are the most widely used vinyl wall coverings. They offer protection from heavy traffic and abrasion. Appropriate uses are lounges, dining rooms, public corridors and classrooms.

Type III, Heavy Duty usually has a Drill fabric backing. They offer protection against hard use. These materials have become rare because of their high cost and the improved performance of Type II wall coverings. They may require long lead times and a minimum square-yard order.

TEXTILE WALL COVERINGS: Fabric wall covering is laminated to a backing for stability and to prevent the adhesive from coming through to the surface. These backings are acrylic or paper. Depending on the textile's characteristics, pre-trim the wall covering before installation instead of overlapping and double-cutting.

Fabrics can be treated for flame retardance and abrasion and soil resistance. Require samples of treated fabrics for discoloration.

Textile wall coverings are produced in a wide variety of widths and lengths. Verify the number of square feet on a given roll and the length of yardage in a bolt.

WALLPAPER: Wallpaper is most common for residential applications. Wallpaper designs are printed by a variety of methods.

Protective polymer coatings enhance performance characteristics. Coatings are either hot- or cold-embossed. Thermoplastic material such as vinyl is used with strippable paper products.

Wallpapers are produced in a wide variety of widths and lengths. Verify the number of square feet on a roll.

HEAVY-DUTY SYNTHETIC TEXTILE WALL COVERINGS: These wall coverings are for heavy-wear areas combining the look and texture of a textile with the stain and abrasion resistance of a vinyl. High performance synthetic yarns are tightly woven into textiles and applied to paper or acrylic backings.

Abrasion resistance ratings for heavy-duty synthetic textile wall coverings exceed those for heavy-duty vinyl wall coverings. Tear and breaking strengths are unmatched by vinyl. These wall coverings can be cleaned with harsh chemicals.

Take special care during installation of these wall coverings to prevent seaming problems. Double-cutting is not possible because of the thickness of the wall covering. Many manufacturers recommend changing the cutting blade after each cut and cutting the wall covering on the back.

These wall coverings are produced in 54- or 60-inch wide rolls in bolts of continuous yardage as needed.

WALL-COVERING CHARACTERISTICS

ASTM F 793 classifies wall coverings by durability. Not all manufacturers classify their products by this standard. It identifies six categories:

Category I, Decorative Only: Chiefly for decorative purposes. Includes wallpaper and other primarily residential wall coverings.

Category II, Decorative with Limited Serviceability: Primarily decorative, but more washable and colorfast than Category I wall coverings.

Category III, Decorative with Medium Serviceability: Use where medium abrasion and stain resistance, scrubability and increased colorfastness are necessary. Category III wall coverings have minimum breaking strength and crocking resistance (resistance to transfer of color from wall covering surface when rubbed) criteria.

Category IV, Decorative with High Serviceability: Use where high abrasion and resistance and scrubability are necessary in heavy consumer and light commercial use. These wall coverings have minimum crocking resistance, heat aging resistance and breaking strength criteria.

Category V, Medium Commercial Serviceability: Use where better-wearing qualities are required and exposure to wear is greater than normal. They have minimum high abrasion, stain resistance and colorfastness criteria, and have higher cracking resistance, tear resistance and breaking strength criteria than Categories I through IV. The following additional tests apply:

Blocking resistance (ability to resist adhesion or sticking between two surfaces of a wall covering)

Cold cracking resistance (resistance to cracking of coated or decorative surface when folded during exposure to low temperatures)

Coating adhesion

Heat aging resistance

Category VI, Full Commercial Serviceability: Wall coverings in this category are made for heavy traffic areas. Category VI wall coverings have the highest resistance to abrasion, staining, tearing, colorfastness, crocking and blocking. Breaking strength, coating adhesion, cold cracking and heat aging tests also apply.

Fire Performance Characteristics: Surface-burning behavior of wall coverings is measured by testing material and its adhesive over an inorganic reinforced cement board. Some wall coverings have inherently low surface burning characteristics. Others require treatment to reduce flame spread and smoke density ratings to satisfy code requirements. Textile and paper wall coverings can be treated to reduce flammability. Fuel contribution is little because of the material's thinness.

Mildew Resistance: Organic materials such as cotton, wool, paper, leather and many adhesives are susceptible to mildew. To reduce mildew staining, wall coverings and adhesives usually contain fungicides which may be toxic, containing arsenic or mercury. "Guard" contract vinyl wall coverings by Columbus Coated Fabrics do not contain arsenic or mercury.

Adhesives: The newer pastes for vinyl wall covering are light-weight clear-drying adhesives. These products leave dull transparent films when dry, eliminating the appearance of paste residue inherent with the traditional opaque clay-based adhesives.

Strippable adhesives save installation time and lessen problems caused by improperly-prepared substrates. A true strippable adhesive allows installation of a fabric-backed wall covering over unprimed gypsum board and removal without damage to the gypsum board.

Vinyl-over-vinyl adhesives are for installations directly over existing wall coverings without adhesion promoting primers and for the installation of borders on vinyl wall covering.

Rely on the wall-covering manufacturer for specific advice and, if possible, the actual adhesive.

Substrate preparation: This is critical to wall covering application. Wall coverings require substrates that are clean, smooth, dry and free of flaking or unsound coatings. To prevent cracks from showing through wall covering, fill and sand rough spots.

COMMON VINYL WALL COVERING BACKING MATERIALS

BACKING MATERIAL

- Scrim (very loose, open weave similar to cheesecloth)

Common Composition
- polycotton

Description
- light-weight

Typical Weight oz./sq. yd.
- 1.2/1.5

Backing Material
- Non-woven (paper-like)

Common Composition
- polyester cellulose

Description
- light-weight

Typical Weight oz./sq. yd.
- 1.0/2.5

Backing Material
- Osnaburg (loose, open weave)

Common Composition
- polycotton

Description
- medium-weight

Typical Weight oz./sq. yd.
- 2.0/3.0

Backing Material
- Non-woven

Common Composition
- polyester cellulose

Description
- medium-weight

Typical Weight oz./sq. yd.
- 2.0/3.5

Backing Material
- Drill (denser, firmer weave similar to twill)

Common Composition
- polycotton

Description
- heavy-weight

Typical Weight oz./sq. yd.
- 2.5/3.0

SPECIAL COATING SYSTEMS

- Damp Wall Coatings
- Cold Cure Coatings
- Fire Retardant Coatings and Finishes
- Coatings for Direct and Indirect Food Contact Surfaces
- Coatings for Potable (Drinking) Water Tanks
- Inorganic and Organic Zinc-Rich Primers

Faux Finishes

Decorative painting techniques allow wall glazing, marbling, wood-graining and other visual transformations of surfaces. Color pooling in cracks, pits and irregularities is magnified. Tools such as floggers, stipplers, graining rollers, combs and feathers achieve the decorative finish. Sponging and ragrolling are texture producing techniques and can hide surface irregularities, embellish existing architecture and add to the beauty of finish coatings.

Multi-Colored, Sprayed-on Finishes

Walls, furniture, industrial equipment and automotive applications may require additional wear and washability attributes from a coating. Sprayed-on multi-color systems offer protection and a dramatic change in appearance. Replicating the color and texture sample may require an on-site mock-up for specifier approval.

INSPECTION PROCEDURES

- Prior to painting, substrates must be clean, dry and sound. Test suspect areas.
- Check adhesion of primers and finishes during progress of the work.
- Check color correctness.
- Measure paint film for adequate dry film thickness.
- Different colors or shades for primers, intermediate coats and finish coat allow easier visual and microscopic determination of film layers and correct number of coats.
- Areas that are difficult to see and paint, such as the tops and bottoms of doors and the underside of wall siding, require additional attention.
- Specify clearly the removal of fixtures prior to application or allowable cutting-in of paint coatings.
- Seal all potential sources of moisture behind the substrate or paint film. Existing caulking may either be removed and replaced or inspected and reinstalled if missing, damaged or brittle. Specify the number of linear feet for reinstalled caulking as a unit-price allowance.
- Verify proper surface preparation.
- Verify correct dry time to recoat.

PAINTS AND COATINGS CONSULTANTS

Hazardous Paint Removal Services – Some coating consulting firms are proficient in hazardous paint removal and abatement and have extensive background in failure analysis. Available services include:

- environmental and lead paint consulting
- comprehensive engineering services for managing hazardous paint projects
- coating consulting
- environmental monitoring
- laboratory testing services
- industrial hygiene safety and health oversight
- construction management
- containment design expertise

The combined skills of mechanical, structural and chemical engineers, safety professionals, industrial hygienists, environmental engineers and coatings consultants are offered as a full service in some coating consulting firms.

Services include:

- project consultation
- specification preparation
- developing plans for worker protection
- environmental protection
- hazardous waste handling/disposal
- ambient air and worker exposure monitoring
- soils and water testing
- containment and ventilation design
- training
- comprehensive project management

Coatings failure analysis – Consultants can conduct site visits to resolve concerns regarding the quality of surface preparation or coating application, make coating repair or repainting recommendations and determine the cause of any coating failures. Field work can include comprehensive measurements of coating dry film thickness, microscopic examinations of coating continuity and integrity, evaluating the underlying substrate for cleaning quality and evaluating possible environmental degradation. Samples for laboratory analysis can be taken and reports provided with recommendations.

Laboratory Services – Most companies maintain a physical testing and analytical laboratory, which may include a gas chromatograph, Fourier transform infrared and atomic absorption/emission spectrophotometer, optical microscopes with microphotography capabilities and wet bench chemistry facilities. Accelerated testing equipment includes salt fog and humidity cabinets, immersion tanks, Atlas cells, QuV, UV light chambers and abrasion and cathodic disbonding apparatus. Some laboratories also maintain a complete supply of test panels and surface preparation and coating application equipment. Field testing is done in exposure stations, from rural to industrial to marine environments. Analytical capabilities are supplemented by physical testing capabilities. Laboratory expertise is further enhanced by practical "field sense" from the firms' inspection work. Coating failure investigation includes the ability to recognize defective workmanship and sophisticated laboratory analysis of the coating system itself.

A permit allowing wastewater generated by high-pressure power washing into storm drains may be obtained by submitting an analysis of the wash water along with specified methods of preventing contaminants from entering storm drains.

SUGGESTED STANDARD SPECIFICATION SECTIONS

The following are a series of suggested specifications developed by many of the specifications writers in the Pacific Rim. These specifications follow the "SpecText" format developed by CSI and the Construction Specifications Research Foundation. They are set up to be edited for content and for insertion of other special information. Special notes to the specifiers are indicated where special care or information is required. Follow these notes closely. A basic knowledge of the subject matter is required before attempting to specify any products. It is recommended that all specifications be done under guidance of a Certified Construction Specifier (CCS) or a Certified Construction Product Representative (CCPR). These people have very specialized education in the preparation of Specifications and have been tested for this knowledge.

SECTION 09900
PAINTS AND COATINGS

PART 1 GENERAL

Specifier Note: *This section includes preparing, priming, painting, and staining finishes to surfaces schedules at the end of the section. Be aware of all regulatory requirements and restrictions on certain types or categories of paint materials.*

Specifier Note: *Due to the large variety of paint materials and qualities available, the specifier should develop this master section by inserting office preferences for paint materials and quality in the schedule listings at the end of this section. This section may also include a color schedule by adding to the end of this section.*

Specifier Note: *This section usually includes field applied finishes for mechanical, electrical, and equipment items.*

Specifier Note: *This section includes performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements.*

1.1 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

B. Surfaces to be finished:

1. Interior and exterior surfaces scheduled to receive painter's finishes.
2. Non-ferrous metals, plated or factory finished items, specifically noted to be painted or when such items occur as accessories and appurtances to surfaces required to be painted.
3. Exposed mechanical and electrical items [in areas to be painted].
4. Exterior mechanical and electrical equipment and items on the roof or building exterior.

C. Surfaces not to be finished:

1. Concrete floors, paving, walks, stairs, and textured concrete. Other concrete surfaces scheduled not to be painted.
2. Stone masonry and masonry scheduled to receive water repellant coatings.
3. Anodized aluminum, stainless steel, copper and plated metals.
4. Structural steel and metal elements designated to receive sprayed fireproofing unless such finishes have been UL tested with the designated assembly and are approved by the fireproofing manufacturer.
5. Finish hardware, unless prime coated.
6. Glass, plastic laminate, and ceramic tile.
7. Acoustical ceilings, unless scheduled to be painted.
8. Integrally colored plaster or EIFS systems.
9. Flooring and floor coverings.
10. Plumbing and lighting fixtures, and electrical device plates.
11. Items with complete factory finishes.

1.2 RELATED SECTIONS

A. Section 02580 - Pavement markings.

Specifier Note: *The following paragraph identifies one or more sections which contain shop primed items. The specifier may elect to develop a list of shop primed items for inclusion in a schedule at the end of this section.*

B. Section [_____-_____]: Shop primed items.

C. Section 06410 - Custom Casework: Shop finished cabinet work.

D. Section [_____-_____]: Special coatings.

E. Section 09815 - High Build Glazed Coatings.

F. Section 09950 - Wall Coverings.

G. Section 15190 - Mechanical Identification.

H. Section 16195 - Electrical Identification.

1.3 REFERENCES

Specifier Note: *List reference standards that are included within the text of this section. Edit the following as required for project conditions.*

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

Specifier Note: *This section can be structured to incorporate industry association reference manuals associated with painting and finishing. The following associations should be consulted for their available manuals. If used, incorporate the references in the appropriate location within this section.*

C. AWWA (American Water Works Association) - C204 - Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping.
D. AWWA (American Water Works Association) - D102 - Painting Steel Water Storage Tanks.
E. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
F. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
G. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
H. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1.4 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 SUBMITTALS

Specifier Note: *Do not request submittals if drawings or specifications sufficiently describe the products of this section. The review of submittals increases the possiblility of unintended variations to the project and can increase the Architect/Engineers' liability.*

A. Submit under provisions of Section 01300.
B. Product Data: Provide data on all finishing products and special coating.

Specifier Note: *Include the following paragraphs for submission of physical samples for selection or approval of finish, color, texture, etc. The first paragraph is intended for selecting colors from manufacturer's color chips. The second paragraph is for reviewing colors that have been selected, on larger samples.*

C. Samples: Submit samples, at manufacturer's normal paint chip size illustrating range of colors and textures available for each surface finishing product scheduled.
D. Samples: Submit samples, 8 1/2 x 11 inch in size illustrating selected colors and textures for each selection. Prepare transparent finish samples on same material as that on which coating will be applied. Identify each sample.

Specifier Note: *When manufacturer's instructions for specific installation requirements are referenced in PART 3 EXECUTION, include the following request for submittal of those instructions. Edit the PART 3 statements to avoid conflict with manufacturer's instructions.*

E. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
B. Single Source Responsibility: Provide primers and other undercoat paints produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and only use within recommended limits.
C. Applicator: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
D. Cooperate with the paint manufacturer's authorized representative to ensure that surfaces are properly prepared for the specified paint systems. Upon completion certify that work has been performed properly, under proper conditions, in accordance with manufacturer's recommendations, and using the specified materials.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

1.8 FIELD SAMPLES

Specifier Note: *Include this article for field applied finish samples.*

A. Provide field sample of paint under provisions of Section 01400.
B. Provide field sample panel, [____] feet long by [____] feet wide, illustrating coating color, texture, and finish.
C. Locate where directed.
D. Accepted sample may remain as part of the Work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.
B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
C. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
D. Provide minimum lighting level of 80 ft candles measured mid-height at substrate surface.

1.11 EXTRA MATERIALS
A. Furnish under provisions of Section 01700.
B. Provide [_____] gallons of each color, type, and surface texture to Owner.
C. Label each container with color, type, texture, room locations, and date, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

Specifier Note: *In each of the applicable following articles, list the manufacturers for the coating products acceptable for this project. If substitutions are allowed, include an appropriate paragraph. Refer to Honolulu Chapter CSI Building Products Directory for assistance in selecting manufacturers.*

A. Manufacturers - Paint
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.
B. Manufacturers - Transparent Finishes
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.
C. Manufacturers - Stain
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.
D. Manufacturers - Primer Sealers
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.
E. Manufacturers - Block Filler
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.
F. Manufacturers - Field Catalyzed Coatings
1. [_____].
2. [_____].
3. Substitutions: Allowed under provisions of Section 01600.

2.2 MATERIALS

Specifier Note: *Edit the following descriptive specifications to identify project requirements and to eliminate any conflict with manufacturer's specified above.*

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
B. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
D. Lead Content: Do not use paint or paint products containing lead.
E. Provide primer and finish coats with a suitable chemical mildewcide in amount to suit local conditions but no less than one ounce per gallon.
F. Patching Materials: Latex filler.
G. Fastener Head Cover Materials: Latex filler.

2.3 FINISHES
A. Refer to schedule at end of section for surface finish [and color] schedule.
B. For bidding purposes, approximately [_____] percent of the surfaces will be pastels and mid tones, and [_____] percent will be deep tones.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Section 01039.
B. Verify that substrate conditions are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
D. Test shop applied primer for compatibility with subsequent cover materials.
E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
    1. Plaster and Gypsum Wallboard: 12 percent.
    2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
    3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.
    4. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.
    5. Concrete Floors: 8 percent.

Specifier Note: *Edit and include only those paragraphs in the following articles on Preparation that are applicable to the project.*

3.2 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
B. Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
C. Seal with shellac and seal marks which may bleed through surface finishes.
D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
I. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.
J. Copper Surfaces Scheduled for a Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.
K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.
T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied.
U. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
V. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.
B. Do not apply finishes to surfaces that are not dry.
C. Apply each coat to uniform finish.
D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
E. Sand wood and metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
G. Allow applied coat to dry before next coat is applied.
H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
I. Prime concealed surfaces of interior and exterior woodwork with primer paint.
J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

Specifier Note: *Reference the relevant mechanical and electrical sections in the following paragraph for color coding techniques.*

A. Refer to Section 15190 and Section 16195 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.

Specifier Note: *If site finish painting of shop prefinished items is required, edit the following paragraph accordingly.*

B. Paint shop primed equipment.
C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports except where items are prefinished.
E. Paint interior surfaces of air ducts that are visible through grilles and louvers, with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers and grilles, to match face panels.
F. Paint exposed conduit and electrical equipment occurring in finished areas.
G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
H. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated.
I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

3.6 PROTECTION

A. Protect other surfaces from paint and damage. Provide "Wet Paint" signs as required to protect newly-painted finishes.
B. Schedule cleaning and painting so that dust and other contaiminants from the cleaning process will not fall on wet, newly painted surfaces.

3.7 CLEANING

A. Clean work under provisions of 01700.
B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

Specifier Note: *The following articles provide schedules for a variety of finishes required. The following examples may assist in development of final schedules.*

3.8 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

Specifier Note: *If a schedule for site finishing of shop primed items is needed, list the items in a tabular form. The following two paragraphs illustrate an example listing.*

A. Metal Fabrications (Section 05500): [Exposed surfaces of lintels,] [elevator pit ladders,] [_____].
B. Metal Stairs (Section 05510): [Exposed surfaces of stringers,] [exposed vertical risers,] [_____].

3.9 SCHEDULE - EXTERIOR SURFACES

Specifier Note: *The following listing includes the most commonly specified surfaces. Edit this schedule listing to suit the specific project.*

A. Wood - Painted (Opaque):
   1. One coat of [latex] [alkyd] [_____] primer sealer.
   2. [One coat] [Two coats] of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]
B. Wood - Transparent:
   1. [One coat] [Two coats] of [stain.] [_____.]
C. Wood - Shingles and Shakes:
   1. One coat of [stain.] [clear sealer.]
   2. [One coat] [Two coats] of [clear sealer.] [_____.]
D. [Glue-Laminated Wood] [Wood Timber] Members:
   1. One coat of [stain.] [sealer.]
   2. [One coat] [Two coats] of [varnish] [_____], [gloss.] [semi-gloss.]
E. Pavement Markings:
   1. [One coat] [Two coats] of [_____] paint, [yellow.] [white.]
F. Concrete, Concrete Block, [Restored Masonry] [Cement Plaster]:
   1. One coat of block primer.

****** [OR] ******

1. One coat of primer sealer [latex.] [alkyd.] [_____.]
2. [One coat] [Two coats] of [latex] [alkyd] [_____], [flat.] [_____.]

G. [Gypsum Board] [Cement Plaster] Soffits
1. One coat of primer sealer [latex.] [alkyd.] [_____.]
2. [One coat] [Two coats] of [latex] [alkyd] [_____], [flat.] [_____.]

H. Steel - Unprimed:
1. One coat of [latex] [alkyd] primer.
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

I. Steel - Shop Primed:
1. Touch-up with [zinc chromate] [zinc rich] primer.
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

J. Steel - Galvanized:
1. One coat [galvanize primer.] [_____.]
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

K. Aluminum - Mill Finish:
1. One coat etching primer.
2. [One coat] [Two coats] of [alkyd] [_____] enamel, [gloss.] [_____.]

L. Copper:
1. One coat etching primer.
2. [One coat] [Two coats] of [alkyd] [_____] enamel, [gloss.] [_____.]

3.9 SCHEDULE - INTERIOR SURFACES

Specifier Note: *The following listing includes the most commonly specified surfaces. Edit this schedule listing to suit the specific project.*

A. Wood - Painted:
1. One coat of [latex] [alkyd] [_____] prime sealer.
2. [One coat] [Two coats] of [alkyd] [latex] enamel, [gloss.] [semi-gloss.] [eggshell.] [flat.]

B. Wood - Intumescent Coating:
1. One coat of prime sealer.
2. [One coat] [Two coats] of intumescent coating.

C. Wood - Transparent:
1. Filler coat (for open grained wood only).
2. [One coat] [Two coats] of [stain.] [_____.]
3. One coat [sealer.] [_____.]
4. [One coat] [Two coats] of [varnish] [_____], [gloss.] [satin.] [flat.] [_____.]

D. Cabinet Interior:
1. One coat of [latex] [alkyd] [_____] prime sealer.
2. One coat of [alkyd] [latex] enamel, [semi-gloss.] [flat.]

E. [Glue-Laminated Wood] [Wood Timber] Members:
1. One coat of [stain.] [sealer.]
2. [One coat] [Two coats] of [varnish] [_____], [gloss.] [satin.] [flat.]

F. Concrete, Concrete Block, [Restored Masonry] [Cement Plaster]:
1. One coat of block filler.

****** [OR] ******

1. One coat of primer sealer [latex.] [alkyd.] [_____.]
2. [One coat] [Two coats] of [latex] [alkyd] [_____], [flat.] [semi-gloss.] [_____.]

G. Steel - Unprimed:
1. One coat of [alkyd] [latex] primer.
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

H. Steel - Primed:
1. Touch-up with [alkyd] [latex] primer] [_____.]
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

I. Steel - Galvanized:
1. One coat [galvanize primer.] [_____.]
2. Two coats of [alkyd] [latex] enamel, [gloss.] [semi-gloss.]

J. Aluminum - Mill Finish:
1. One coat etching primer.
2. [One coat] [Two coats] of [alkyd] [_____] enamel, [gloss.] [_____.]

K. Concrete Floors:
1. One coat of [alkali resistant] [catalyzed epoxy] primer.
2. Two coats of [alkyd floor enamel] [catalyzed epoxy enamel], [gloss.] [_____.]

L. Plaster, Gypsum Board:
1. One coat of [alkyd] [_____] primer sealer.
2. [One coat] [Two coats] of [alkyd] [latex] [latex acrylic] [_____] enamel, [gloss.] [semi-gloss.] [eggshell.] [flat.]

Specifier Note: *Coordinate the following with Section 09950 - Wall Coverings.*

M. Wall Surfaces Under Vinyl Wall Covering:
   1. [One coat] [Two coats] of [alkyd] [_____] primer sealer.

N. Fire Retardant Finish
   1. One coat of fire retardant primer.
   2. Two coats of fire retardant finish, [gloss.] [_____.]
   3. Flame and smoke rating of [25/5.] [____/____.]

Specifier Note: *The following finish treatment should be modified if a fungicide needs to be added to the paint materials for mold control.*

O. Insulated Coverings - Canvas and Cotton:
   1. One coat of [alkyd] [_____] primer sealer.
   2. [One coat] [Two coats] of [alkyd] [_____] enamel, [gloss.] [semi-gloss.] [eggshell.] [flat.]

3.10 SCHEDULE - COLORS

Specifier Note: *Develop a format for clearly presenting room colors, accent walls, deep shade colors, super graphics, special trim and markings. The following paragraphs illustrate an example listing.*

A. Classroom 201: North, west, and east walls - #3184 blue. South accent wall - #4467 yellow. Paint access panels same as walls. Paint convector cover - #2237 pink.
B. Principal's Office: Walls - #1234 green. Stain wood glazed frames to XXXXX - Honey Blonde and varnish.

END OF SECTION

REFERENCES

American National Standards Institute (ANSI):
A13.1-81 - Scheme for the Identification of Piping Systems
H35.1-88 - Alloy and Temper Designation Systems for Aluminum

American Society for Testing and Materials (ASTM):
D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
D260-86 - Boiled Linseed Oil
D2016 - Test Method for Moisture Content of Wood.
E84 - Surface Burning Characteristics of Building Materials.
F793 - Classification of Wallcovering by Durability Characteristics.
G21-90 - Determining Resistance of Synthetic Polymeric.

American Water Works Association (AWWA):
C204 - Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping.
D102 - Painting Steel Water Storage Tanks.

Chemical Fabrics and Film Association, Inc. (CFFA):
W-101-A-84 - Vinyl Coated Fabric Wallcovering

Commercial Item Description (CID):
A-A-1272 - Plaster, Gypsum (Spackling Compound)
A-A-1555 - Water Paint, Powder (Cementitious, White and Colors)
A-A-2210 - Filler, Wood Paste

Federal Specification (Fed. Spec.):
L-P-1040 - Plastic Sheets and Strips, Polyvinyl Fluoride.
MMM-A-130B INT AMD 3 - Adhesive, Contact
P-W-155C INT AMD 1 - Wax Floor, Water-Emulsion
TT-C-535B(2) - Coating, Epoxy, Two Component (For Interior Use On Metal, Wood, Wallboard, Painted Surfaces, Concrete And Masonry)
TT-C-542E - Coating, Polyurethane, Oil Free, Moisture Curing
TT-C-555 - Coating, Textured (For Interior and Exterior Masonry Surfaces).
TT-E-487D(1) - Enamel, Floor And Deck
TT-E-489H - Enamel, Alkyd, Gloss Low VOC Content
TT-E-506K - Enamel, Alkyd, Gloss, Tints And White (For Interior Use)
TT-E-508C - Enamel, Interior, Semigloss, Tints And White
TT-E-545C - Primer (Enamel, Undercoat Alkyd Odorless, Interior, Flat Tints And White)
TT-F-322D INT AMD 1 - Filler, Two-Component Type, For Dents, Cracks, Small-Holes And Blow-Holes
TT-F-340C - Filler, Wood, Plastic
TT-F-1098D - Filler Block, Solvent-Thinned, for Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.)
TT-P-19D - Paint Latex (Acrylic Emulsion, Exterior Wood and Masonry) TT-PO25E(2) - Primer, Coating, Exterior Undercoat For Wood, Ready-Mixed, White And Tints
TT-P-26C(1) - Paint, Interior, White, Tints And Black, Fire Retardant
TT-P-28G - Paint, Aluminum, Heat Resisting (1200 Deg. F)
TT-P-29J INT AMD 2 - Paint, Latex
TT-P-30E(1) - Paint, Alkyd, Odorless, Interior, Flat, White And Tints
TT-P-38E - Paint, Aluminum (Ready-mixed)
TT-P-59E(1) - Paint, Ready Mix, International Orange (Not For Residential Use)
TT-P-95C(1) - Paint, Rubber, For Swimming Pools And Other Concrete And Masonry Surfaces
TT-P-96D(2) - Paint, Latex-Base, For Exterior Surfaces (White And Tints)
TT-P-102E INT AMD 1 - Paint, Oil (Alkyd Modified, Exterior, Low VOC)
TT-P-641G(1) - Primer Coating, Zinc Dust-Zinc Oxide (For Galvanized Surfaces)
TT-P-645B - Primer, Paint, Zinc-Molybdate, Alkyd Type
TT-P-650D - Primer Coating, Latex Base, Interior, White (For Gypsum Wallboard, or Plaster)
TT-P-664D - Primer Coating, Alkyd, Corrosion-Inhibiting, Lead And Chromate Free, VOC-Complaint
TT-P-791B - Putty, Pure-Linseed-Oil Type (For Wood-Sash-Glazing)
TT-P-1411A - Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls)
TT-P-1511B - Paint, Latex (Gloss And Semigloss, Tints And White) (For Interior Use)
TT-P-2119 - Paint, Latex-Base, High Traffic Area, Flat And Eggshell Finish, (Low Lustre), (For Interior Use)
TT-S-176E(1) - Sealer, Surface, Varnish Type, Floor, Wood and Cork
TT-S-179B(1) - Sealer, Surface, Pigmented Oil, For Plaster And Wallboard
TT-S-711C - Stain, Oil Type, Wood, Interior

Military Specifications (Mil. Spec.):
MIL-P-21035B - Paint, High Zinc Dust Content, Galvanizing, Repair

ational Association of Corrosion Engineers (NACE):
Industrial Maintenance Painting.

National Fire Protection Association (NFPA):
101-88.....Code for Safety to Life from Fire in Buildings and Structures
255 - Test of Surface Burning Characteristics of Building Materials.
701-89 - Flame-Resistant Textiles and Films. Fire Tests.

National Paint and Coatings Association (NPCA):
Guide to U.S. Government Paint Specifications.

Painting and Decorating Contractors of America (PDCA):
Painting - Architectural Specifications Manual.

Steel Structures Painting Council (SSPC):
SP 1-89 - No. 1. Solvent Cleaning
SP 2-89 - No. 2. Hand Tool Cleaning
SP 3-89 - No. 3. Power Tool Cleaning
Steel Structures Painting Manual

Underwriter's Laboratories Inc. (UL)
Fire Resistance Directory.
723 - Tests for Surface Burning Characteristics of Building Materials.

Western Wood Products Association (WWPA):
Research Note No.312 (Revised Jan 30, 1985) - Painting Over Knots

UNFORTUNATELY, PRECISION IS NOT BUILT IN.

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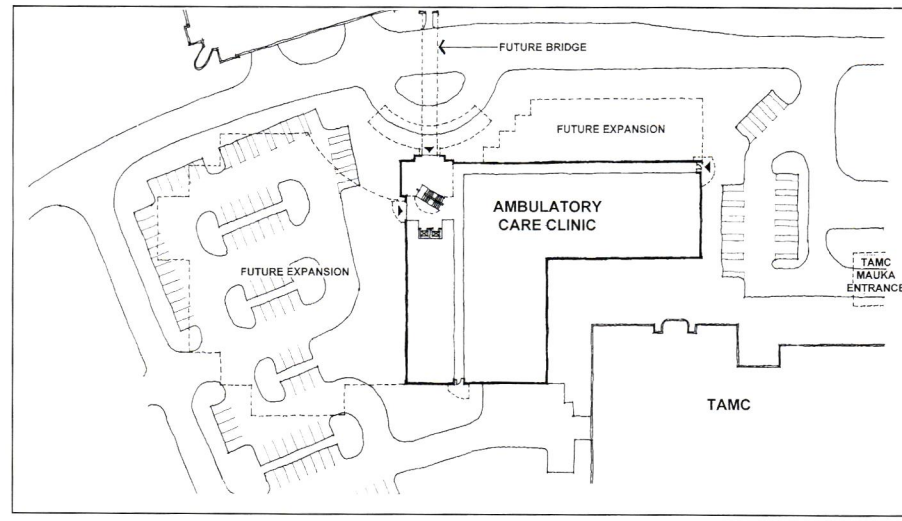
of the ell on axis with the parking garage's pedestrian entrance, providing clear orientation for patients parking in the garage. Secondary entrances access Tripler's mauka entrance and the on-site patient parking.

The main entrance is a three-story space. Though modest in size, it is visually inviting. Fully-glazed exterior walls, clerestory windows and a hip roof identify it as the entrance point. In the evening, it becomes an illuminated beacon.

Inside, visitors will be greeted at a reception desk. Just beyond, elevators and a striking open stair provide access to the upper floors. The main corridors on each floor pass through the entrance space. The entrance space is the hinge for the whole building, connecting all the major vertical and horizontal circulation paths.



The clinic site allows for future expansion.

Site plan diagram by Larry Bongort, AIA

Maintaining Tripler's Identity

The exterior incorporates many of the elements found in the original Tripler buildings: the signature pink color with cream trim and blue-green accents, the window shapes and proportions, the eyebrow roofs at windows and the paired pilasters. Using these features with attention to proportion, the building blends in smoothly with the original building while maintaining a distinctive identity. There is a hierarchy of scale and detail; some features are clearly visible from a distance while others are only seen up close.

A sweeping canopy provides covered drop-off at the main entrance. Smaller canopies mark secondary entrances. The canopies pick up the blue-green color of the terra-cotta panels on the original building, a cool accent against the Tripler pink.

The main corridors in the Diamond Head wing run along the mauka side of the building, offering exterior views and an abundance of daylight. Clinic waiting spaces fall along these corridors. Large interior windows allow them to borrow the views and daylight and easily identify their entrances.

Other interior design features address particular needs of DVA patients. Ceilings in the mauka corridors are sloped, low on the inside and high on the outside, giving the corridors a certain "handedness" as an aid to orientation. This ceiling profile continues as the corridors turn and head makai. Stair nosings contrast sharply with the treads, helping those with impaired vision. Colors, finishes and lighting respond to the reduced color sensitivity and increased sensitivity to glare common in older patients. The compact floor plan minimizes travel distances for patients with reduced mobility. Handrails in the corridors aid those who need to steady themselves. *(Continued)*

Early Challenges

Using the DVA-generated program, AHL first developed block diagrams showing locations of clinics and departments, then room-by-room layouts. Problems surfaced when reviewing these with the local DVA staff. The department organization originally requested required mixing essentially incompatible types of patients and didn't fit the local DVA's pattern of care delivery.

AHL was directed to reprogram, reorganize and replan the facility to better meet the needs of patients and staff, with the stipulation that the net and gross areas, the building envelope and the major circulation and mechanical systems not change.

To reprogram the medical clinics, AHL interviewed DVA personnel about their existing facility, inquiring what was working, what was not and what their ideal clinic would feature. Goals were to focus on patients, simplify processes and minimize waiting times. Working with the staff, AHL developed the program for small clinic modules to replace the centralized waiting area and banks of examination rooms called for in the original program.

From a small check-in area, patients will proceed to the waiting area within the module where they have their appointment. In each module, eight exam rooms are clustered around an open area. Four nearby physician offices double as consultation rooms. Pairs of clinics share utility rooms and toilets. Scheduling of follow-up appointments will take place in the exam room, simplifying the process.

Patient-Based Care

The module concept supports a team approach to providing care, minimizes travel distances and allows staff to focus on patients. State-of-the-art communication systems will further enhance efficiency.

The reorganization allowed the clinics to form cohesive groups. The first-floor mental health clinic spaces are oriented to the exterior, share support facilities and can use a sheltered outdoor court. The medical clinic modules, pharmacy, lab and radiology are all on the second floor, minimizing travel distances for patients who need a prescription or test. Specialized clinic areas – dentistry, rehabilitation medicine, the women's clinic – are on the third floor along with medical records, information resources and the administrative suite.

The reworking of programs addressed patient and staff needs and had an additional benefit. It effectively demonstrated the building's ability to support change as programs change over time. Veterans can look forward to a facility which will respond to their needs well into the next century.

Larry J. Bongort, AIA, is a medical planner at Architects Hawaii. He is a member of the AIA Academy of Architecture for Healthcare and the American Society for Healthcare Engineering, and is the medical planner for the Department of Veterans Affairs Medical and Regional Office Center project at Tripler Army Medical Center.

News Briefs

AM Partners, Inc. Wins National Award

The National Commercial Builders Council, a division of the National Association of Home Builders, has issued a "Grand Award" to AM Partners, Inc., for the design and construction of Hanalei Elementary School in Kauai. The Honolulu-based firm looked at the devastation of the school caused by Hurricane Iniki and presented a design that would be sensitive to the community.

The design approach of the new library and cafetorium maximizes the "plantation" theme of the neighborhood and provides a Hawaiian sense of place through the use of vernacular elements. The firm also recently received an Award of Excellence in the 1997 AIA Design Awards competition.

Assisted Living Design Conference Scheduled

"From the Outside In: Designing and Operating Assisted Living Facilities in Hawaii" will be held at the Sheraton Waikiki Nov. 21, 1997. The conference is sponsored by Assisted Living Options Hawaii (ALOH) and co-sponsored by AIA Honolulu and BIA. For more information, call 839-2462.

Ferraro Choi to Design Antarctica Project

Ferraro Choi And Associates Ltd, Honolulu, has been awarded the first of three design phases for the $115 million modernization and expansion of the United States' Amundsen-Scott South Pole Station in Antarctica. The project will include laboratory, habitat and support facilities for scientists who reside and perform research at the site. Ferraro Choi's involvement includes the design of approximately 35,000 square feet of new facilities for the first phase. Future design phases will include another 35,000 square feet of facilities and the renovation of a portion of the existing camp.

Masui and School of Architecture Recognized by CSI

The Honolulu Chapter, Construction Specification Institute recently presented its Chapter Organizational Certificate of Appreciation to administrative officer Joyce Masui and the University of Hawaii School of Architecture. The award is presented to firms and organizations for distinguished accomplishments in the advancement of construction technology. The School of Architecture has been active in supporting CSI's programs and has developed strong working relationships with a variety of construction industry organizations.

Correction

In the Steel Styles advertorial in the October 1997 issue of *Hawaii Pacific Architecture*, we neglected to credit Bill Hagstotz as the photographer of the Neiman Marcus store construction. We regret the error.

One Kalakaua offers comfortable senior living

Inviting, Not Imposing

by Jennifer W. Scott, AIA

Maintaining a sense of independence yet having the security of medical assistance when needed is important to everyone, particularly the elderly. One Kalakaua Senior Living and Health Center fulfills those needs.

Located at the intersection of Kalakaua Avenue, Beretania Street and Young Street, the facility provides a range in level of assistance to residents, from completely independent living, to minimum assistance through programs available from operator Life Care Services, to full assistance at the health center, *Hale Ola Kino*.

The architectural firm of Wimberly Allison Tong and Goo worked closely with Life Care Services in developing the design of common spaces and finalizing the program to meet the objectives of the owners and operators. The building includes 166 fee simple condominium units with 14 different floor plans on each floor, including one bedroom and one bathroom units, two bedrooms with one bathroom and two bedrooms with two bathrooms.

Each unit was designed with a full kitchen, a 24-hour emergency call system, provisions for grab bars in bathrooms and emergency cords. The building is fully air-conditioned; however, windows at residential units and at the health center are also operable.

Three floors of common areas provide services and activities for residents. There are two levels of basement parking spaces for residents and additional guest parking at the ground level. The building was designed to allow for numerous simultaneous activities, allowing Life Care Services to offer a variety of programs for residents.

The residential flavor of One Kalakaua is carried through in the interior design. Photos by Olivier Koning

There When It's Needed

Hale Ola Kino, which means "House of Wellness," is a 32-bed skilled nursing unit occupying the entire second floor. There are 15 semi-private and two private bedrooms, each with a toilet and lavatory room. The center provides rehabilitative and long-term care programs, as well as respite services. Rehabilitative programs include speech and occupational therapy.

The design intent was to provide both a comfortable and technically skilled environment. Residents may be comforted by the fact that this floor is available in the event that full-time assistance is needed. The center includes patient bathing rooms with whirlpools, a therapy room, beauty shop, dining room and recreational room. The second floor is carpeted throughout in order to provide a more residential rather than institutional atmosphere.

The main entrance to the building is on Young Street. The ground floor includes the main lobby and lounge, the main dining room and cocktail lounge, kitchen, a multi-purpose

room for lectures, dances and videotaped presentations, a mail room, men's and women's toilet and shower rooms and an exercise room, which is directly accessible to the outdoor pool and spa.

Another lounge is located at the basement level, as well as a library, beauty shop, arts and crafts room, game room and conference room. Administrative staff and operational facilities are also located at this level.

Both private and common spaces at One Kalakaua were designed to be sensitive to the needs of the aging for socializing and maintaining an active lifestyle. One Kalakaua proves that assisted living facilities can be designed to be comfortable and inviting, not sterile and institutional.

Jennifer W. Scott, AIA, is a project manager/project architect with Wimberly Allison Tong and Goo Architects, Planners and Consultants, Honolulu.

The pool area looks like those found at hotels and luxury condominiums.

Client, architect and contractor must work together

Teamwork Gets the Job Done

by Michael Y. Nakahara

In late 1995, when officials of Rehabilitation Hospital of the Pacific (REHAB) opened construction bids for the facility's major remodeling work, hospital officials discovered that even the lowest bid was significantly more than their fundraising efforts.

It could have been a dark day for REHAB, for Allied Builders System, the low bidder for the job, and for Sueda & Associates Inc., the architects who provided design ingenuity to bring the maturing facility into the new millennium. Therefore, the firms set about value engineering the project. Each organization committed to giving REHAB the renewal it deserved in a cost-effective time line.

Corridors at REHAB have been opened to more light.

Photo by Augie Salbosa

The first mutual decision was to revise Phase I to cover the most needed aspects of the job, including new ADA requirements, code corrections and upgrading the infrastructure. The field crews reported to the job site in April 1997, while hospital administrators, Sueda & Associates and Allied personnel set about re-working the plan for Phases II through V, covering five wings on nine floors. Over a three-month period, all parties discussed cost-saving concepts.

Experience Counts

It helped that Allied had established a good working relationship with Sueda & Associates from previous jobs together. An understanding of each other's working methods was already in place. Furthermore, Allied had experience in medical renovations – among the toughest of all contracting assignments – and knew that competent, dedicated engineers should oversee the work.

REHAB's goal was to create a modern facility for inpatient and outpatient care. Plans called for integrating new technological systems, modernizing infrastructure, opening rooms and corridors to more light, beautifying interiors and making better use of space for medical treatment and recreation.

Allied Builders rebuilt the interior of each wing. In some cases this meant replacing walls, flooring, plumbing, air conditioning and wiring. Restrooms were rebuilt to support the special needs of a rehabilitative facility. All electronic safety and emergency systems were replaced. Mechanically, the facility was overhauled to meet or exceed current plumbing and fire codes.

Communication Is Key

As a rule, every person assigned to hospital contracting – down to the last specialty laborer – has to recognize the life safety ele-

ments involved. These heighten the need for careful, continuous communications with the client's staff, from administrators to floor nurses, and thinking through fully the contract's scheduling details to provide for the patients' welfare.

Remodeling construction is very disruptive and frustrating to medical professionals who are trying to help people recover from a traumatic event. Teamwork among all project participants is especially critical. In the case of REHAB, Allied advised the hospital employees what to expect at all times and they, in turn, told Allied how much disruption they could tolerate and the most appropriate working hours.

The team also needed to mentally build the job first, sequence by sequence. This was the best way to create optimal coordination and minimal impact on patients and medical procedures when the work actually began.

In some cases, REHAB staff moved patients from wings under construction to other wings for their therapy and treatment. At other times, Allied temporarily positioned equipment on lower floors so that work coming later on the floors above would be expedited.

Of course, there are always surprises in remodeling, especially in a facility such as REHAB which began operations in a three-story structure and basement in the late '40s, with wings and floors added over the next three decades. The as-builts were non-existent and the project had many unforeseen factors on the contracting side, requiring design changes and field solutions. The contingency budget created during early meetings with the architect and client provided funds to cover costs incurred due to concealed conditions.

In complex remodels like this, Allied has found that it helps tremendously to have the clients designate a project manager of their own. The representative should understand construction plans and specifications and provide a communications liaison to the client's board of directors, staff and customers – in REHAB's case, the patients.

Allied stresses teamwork in its marketing programs, but the truth is that such talk must be walked by everyone involved in a medical remodeling effort. The bigger the job, the more it's needed. Trying to rehab REHAB wouldn't have worked without it.

Michael Y. Nakahara is president of Allied Builders System, Honolulu.

AIA HONOLULU 1997

Award of Merit

Single Family Residential

John Hara Associates Inc.

Wailupe Residence

The scope of this project was to combine the attributes of an oceanfront, urban Honolulu site with the program requirements for a residence for a family of six. John Hara Associates Inc. established inside/outside and public/private relationships with consideration of the family's lifestyle.

The site made it possible to capitalize on elements available in a benign climate, such as natural ventilation and multiple exposures to daylight. A diminished distinction between outdoor and indoor living created a balance of shelter and openness. Layered enclosures employing shutters, screens and glass doors achieved optimum privacy. Materials both traditional and durable, such as teak, slate, granite and plaster, developed a contemporary expression.

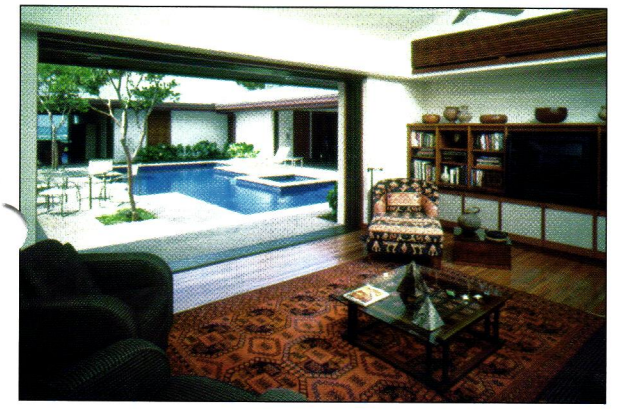
The architecture of the Wailupe residence complements the lifestyle of the family it houses. While maintaining full and constant intimacy with the surrounding environment, the house also respects its neighbors and honors its inhabitants.

Closing the wood shutters creates a private environment in the dining room (top); the entry foyer emphasizes the importance of natural light and materials in the architectural style of the structure (above).

A view of the makai exterior of the house shows its wood detailing and well-manicured lawn.

Jury's Comments:

"The visual experience from the entry throughout the residence is very controlled. Small views to the inner courtyard and the big ocean view are presented along this entry way. Semi-private spaces are linked throughout the courtyard without losing bedroom privacy."



The stylish yet comfortable family room connects to the outdoor courtyard and swimming pool.

Credits

Owner/client:
Name Withheld

Architect:
John Hara Associates Inc.

Contractor:
Robert M. Kaya Builders, Inc.

Consultants:
Civil: Hida, Okamoto & Associates, Inc.
Structural: Robert Englekirk Consulting Structural Engineers, Inc.
Mechanical: Cedric D. O. Chong & Associates, Inc.
Architectural Lighting: Fisher, Marantz, Renfro, Stone
Landscape: Walters, Kimura, Motoda, Inc.

Roof designers must take Hawaii's hurricanes into consideration

Shelter From the Storm

by Michael D. Smith, CSI

Unlike a roof leak, which forces the building owner to take corrective action, an inadequately or defectively anchored roof system is seldom repaired until disaster strikes.

Four hurricanes have hit Hawaii since 1957, resulting in lost lives and multimillion dollar damages. Dozens of tropical storms are recorded each year and wind gusts exceeding 60 mph are a normal occurrence. Hawaii's unique topography also can produce unusual weather patterns, creating extraordinary wind uplift and scour forces. Consequently, designers should adopt a conservative approach to wind uplift.

About 85 percent of roof blowoffs start with failure at the fascia – gravel stop, drip edge or parapet coping. Wind forces the fascia strip upward and outward, exposing more of its area to the wind. The fascia strip is then pried off, exposing the roof assembly to peeling and suction forces.

The loss of opening protection allows wind entry and increases internal pressure, supplementing uplift forces at the roof surface. Positive internal pressures within the building can combine with negative external pressure to produce extraordinarily high uplift and suction pressures.

It has been estimated that 90 percent of the buildings damaged in hurricane Iniki were in violation of local building codes. Examples of defective construction were:

- Grossly deficient nailing of roof sheathing to supporting wood trusses. (Spacing was sometimes three times the 6 inches mandated by code, with nails often missing or insufficiently penetrating their substrate.)
- Substitution of staples for nails to anchor sheathing.
- Omission of hurricane anchors, anchoring roof trusses to their bearing walls.
- Failure to anchor insulation boards to roof decks.
- Failure to provide the correct number of fasteners required.
- Substitution of defective, substandard fasteners for code-mandated fasteners.
- Inadequate attachment of window units and glass doors.
- Severe corrosion of fasteners and attachments.

Following are recommendations to help ensure proper wind-uplift performance of roofing materials:

1. Research the product requirements. Request data on wind-uplift resistance from the manufacturer. Check UL or FM listings for wind-uplift approval of proprietary products.
2. Provide the project description, location and warranty requirements to the product manufacturer's technical service department, requesting written installation instructions.
3. Require the contractor to submit the roofing system manufacturer's review and acceptance of contract documents and applicator and warranty conditions.
4. Never substitute any component within a roof assembly rated for wind uplift. Ratings apply to the entire roof assembly, not to individual components.
5. Whenever practicable, specify mechanical fastening instead of cold-applied or hot-mopped adhesive for low-slope nailable decks.
6. Specify minimum 22-gage thickness for steel decks.
7. Specify minimum 18-gage for metal gravel stops or fascia strips.

8. Specify a continuous cleat or hook strip for stabilizing the bottom of fascia strips on low-slope roofs.
9. Specify fastening requirements for high-wind conditions in accordance with manufacturer's instructions.
10. Specify stainless steel fasteners for exposed conditions.
11. Secure the edges of asphalt shingles at rakes, hips, ridges and eaves with two dabs of asphalt roofing cement prior to nailing.
12. Secure the perimeter zone of shake-like products at rakes, hips, ridges and eaves with dabs of a high-performance urethane or tripolymer sealant.
13. Require that design criteria for wind loading for windows and glass doors are the same as those for the structure itself.
14. In areas of greatest exposure to wind-blown projectiles, consider the use of in-place shutters or other emergency protection devices, a reduction in the use of glazing and increased use of shatter-resistant transparent material.

Michael Smith, CSI, CCCA, CCS is president of Smith Hawaii, Inc., a consulting firm specializing in roofing, waterproofing and exterior finishes.

New Products

AMP Introduces "Air-Loop" System

Architectural Metal Products, Inc.'s new unitized "air-loop" pressure equalized curtainwall system has been tested to higher pressures than any other curtainwall system on the market with no water leakage. AMP specializes in standing seam metal roofing for commercial and industrial building projects and curtainwall systems for high-rise construction. Recent projects include the Hawaii Convention Center.

AMP recently opened a new office at 1088 Bishop St., Ste. 1227. For more information, call Todd Beasley at 528-1790.

"Allied Builders rewrote our view of Hawaii contracting..."

So observes architect Kevin Coleman of California based Net Development in recalling plans' execution for Honolulu's new Renal Treatment Centers facility.

This fast-track project involved front-end unknowns, a series of medical moves — and human lives depending upon Allied Builders' speed, sensitivity, pro-active thinking and ability to work in concert with continuing renal care.

Recalls owner's representative Alvin Cecil: "Allied Builders' coordination with hospital staff was hand-and-glove superb. They brought order out of chaos for us, and they accomplished all the change orders we requested and still got the job done on time."

Adds Coleman: "Work with Allied Builders again? In a heartbeat..."
And heartbeats were what this job was all about.

ALLIED BUILDERS SYSTEM
Teamwork. Our motto. Our method.

1717 Akahi Street, Honolulu, Hawaii 96819, Telephone (808) 847-3763
Contractor License BC-5068