

# BUILDING INDUSTRY HAWAII

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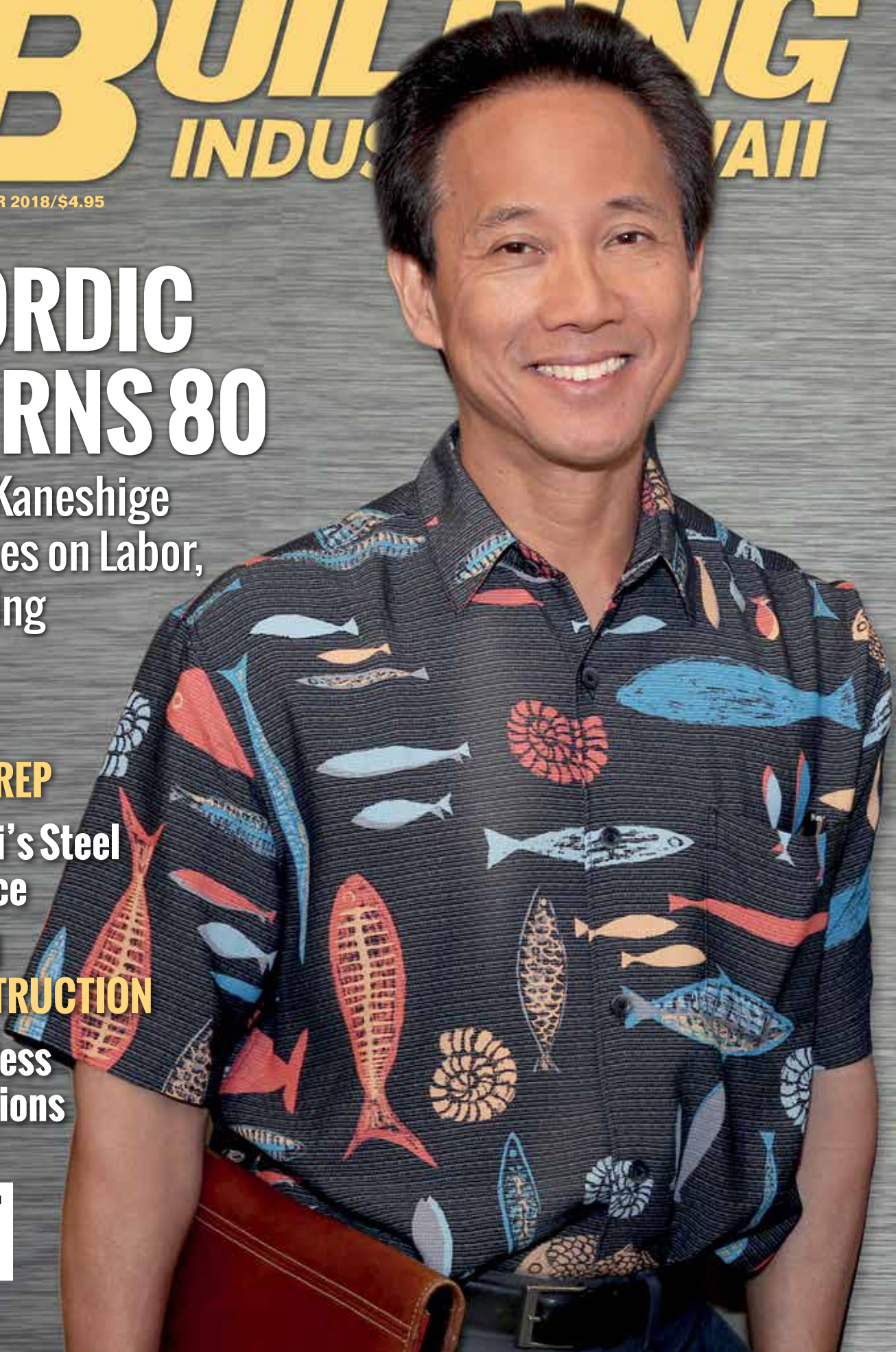
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Corroded railing post and spalling  
PHOTO COURTESY STRUCTURAL SYSTEMS INC.



# Fatal Flaws

## Design and construction defects in Hawaii's concrete decks hurt victims—and builders

BY BRETT ALEXANDER-ESTES

A recent fatality at Ala Moana Center that occurred when a railing reportedly gave way is still fresh in the minds of many Hawaii residents. As the Ala Moana accident and a later lawsuit show, defects can endanger the people who stand on Hawaii's concrete decks—and the people who build them.

More than one accident has occurred on Hawaii's concrete decks. That's because all concrete platforms in Hawaii—lanais, balconies, stairways, even walkways and foundations flush to the ground—are vulnerable to metal corrosion and spalling, a chemical process that destroys concrete.

"With our salt air and rain, the rebar (in concrete) rusts quickly, which expands and breaks off the edge of the concrete," says Don Fernandez,



Don Fernandez

president of Epoxy Restoration LLC. "Since railings are on the edge of decks, the railing system soon loosens and fails." "We see failures typically at structural connection points, where aluminum rails get tied together with steel screws, where steel rails embed into reinforced concrete," says Damien Enright, president of Structural Systems Inc./Kelikai Inc. "Any location where you have

dissimilar metals coming in contact (aluminum post next to steel rebar), or a metal component next to moisture and salt (chlorides), you will typically see a hot spot for corrosion."

Corrosion, spalling and loose railings are accelerated by "bad design, defective construction or inadequate



Kenneth Kasdan

maintenance, or any combination of these factors," says Kenneth Kasdan of Hawaii law firm Kasdan LippSmith LLLC.

If these defects cause an accident, there is always

more than one casualty.

"Many parties share responsibility," says Kasdan. "The owner sues the developer or general contractor. Then the contractor often sues the subcontractors—both framer and concrete subcontractor—for placing the metal too close to the exposed surface, or providing concrete of inferior quality which allows moisture, containing salts, to get to the metal."

### Design Defects

Often, Kasdan says, failures are caused by "mistakes in the design of the railings, lanais, balconies or other components of the building."

If a railing is "bolted down" into either a wood or concrete deck, Kasdan says, the strength of the bolt and method of attachment must often be calculated by the structural engineer of record. If this component is a design-build element, he says, shop drawings must be prepared and approved.



Damien Enright



Railing corrosion  
PHOTO COURTESY KASDAN LIPPSMITH LLC

“The number of bolts, the length of the bolt, how it is affixed into the concrete deck, how close the bolt is to the edge of the deck—all must be considered, as they all contribute to ultimate strength,” Kasdan says.

Railings likewise must be carefully chosen. Kasdan cites railing height, the space between pickets, how vertical and horizontal rails are designed and installed, and age.

“(Building) codes 30 to 40 years ago allowed railings to be lower than today,” he says, adding that a builder is generally not required to retrofit unless that portion of the building is being reconstructed.

“This can be a huge issue if older buildings are being converted into timeshares or smaller boutique hotel properties,” he points out. “Even if code-compliant, an owner/operator would be well-advised to bring the height up to current code to simply make it safer. Many insurance policies

may require such.”

## Construction Defects

Fernandez cites three common construction practices that can cause railings on concrete platforms to fail:

First, “a pocket is formed in the original concrete pour,” Fernandez says. “Aluminum railing posts are set in the pocket and filled with anchoring cement. The older anchoring cements disintegrate over time, resulting in unsafe loose post mounts which also allow water to enter deep into the concrete, causing spalling.”

Second, “there is typically an edge rebar on lanais and walkways,” he says. “More often than not, there is insufficient concrete coverage to protect rebar from moisture attack.”

Third, “many buildings still have steel railings placed in the original concrete pour,” he says. “The grade of steel is almost never rust-resistant. Without constant painting, they rust

out and fall apart.”

Kasdan says builders must keep their eyes peeled:

“The contractor must follow the plans and conform to their requirements,” he emphasizes. “Were corrosion-resistant stainless-steel bolts or screws specified, but less expensive galvanized screws used? Was the specified brand, which has been properly tested and certified, used, or was a cheaper off-brand used? All this needs to be carefully monitored during construction.”

## A Rise in Lawsuits

“Very few new cases are being filed based on claimed defects in just the railing or walkway construction,” Kasdan says. “Suits based solely on railings or walkways are generally personal injury-related slip-and-fall matters.

“However, new construction defect cases are filed where defective railings or walkways are included in a larger list



A recent balcony repair by Structural Systems  
PHOTO COURTESY STRUCTURAL SYSTEMS INC.



A recent concrete deck and railing repair by Structural Systems  
PHOTO COURTESY STRUCTURAL SYSTEMS INC.

of defects,” he says. “There has been an increase in new construction defect cases being filed ... some even before buildings are finished and sold out.”

### Proactive Measures

“The best defense to avoid defect claims is proactive supervision,” Kasdan says. “Many large developers now hire a second architect or engineer to review the plans for both buildability and code compliance.

“Developers are now also routinely

**“All railing repairs should be engineered and designed by a structural engineer in order to ensure that any fix will be long-lasting, and won’t be in danger of failing if too many people put weight on it.”**

**—Damien Enright**

hiring a construction management firm to oversee the work as an owner’s representative,” he says. “Consideration should be given to engaging the architect who prepared the plans to also perform periodic construction inspections.”

Kasdan says that when a defect is found during any inspection, corrosion—the source of the problem—has to be removed, then proper remedial measures taken.

“Merely painting over with a so-called rust-stopping paint from a big box hardware store is not sufficient,” he says. “There are numerous high-tech, sophisticated corrosion inhibitors on the market. The right professionals need to determine the problem, specify the fix, and see that the contractor does the repair correctly.” 🏠

## Tips on Deck Repair

Damien Enright, president of Structural Systems Inc./Kelikai Inc., and Don Fernandez, president of Epoxy Restoration LLC, say their companies regularly conduct inspections of Hawaii’s concrete decks and platforms.

### CORROSION AND SPALLING

When corrosion and spalling are found, says Enright, “the very first step is to block off the immediate area to prevent any access to the upcoming work area by pedestrians or vehicles.”

Enright says the contractor should then:

- Demolish all loose and unsound concrete
- Clean off all corrosion from metal reinforcements
- Coat all metals with a corrosion-inhibiting epoxy
- Pour the area back with high-strength repair mortar to match the building’s existing dimensions
- Remove and replace any loose concrete around a loose railing post

### STEEL RAILINGS

When steel railings are badly corroded, Enright says, first determine if repair costs are less than the cost of a total replacement. If so, the contractor will “cut out any severely corroded sections, weld on new matching pieces and paint the entire rail system to protect it from the elements.”

If damage is not severe, Fernandez recommends grinding and wire-brushing rusted steel rails. Then “we can fill pits with epoxy paste and apply a rust-neutralizing coating to the rails,” he says. “We will also spot-prime and paint with a high-quality metal enamel.”

### ALUMINUM RAILINGS

“If the post mounts have not spalled out,” Fernandez says, “we can chip out the deteriorated mounting cement and replace with permanent epoxy cement.”

“Aluminum railings do better in our salty environment,” Enright says, “but unfortunately aren’t normally candidates for repair once they’ve reached a point of failure. Once the aluminum components have corroded to a point where we see pickets or bottom rails becoming loose, that railing has failed.”



A recent deck repair by Structural Systems  
PHOTO COURTESY STRUCTURAL SYSTEMS INC.