Wood's Performance in Paradise: a case study of Doris Duke's Shangri La

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Abstract This paper discusses the microclimate evaluation, condition assessments, challenges of limited in situ testing, and recommendations for prioritization and planning conservation work specific to the wood elements at a large 1937 historic estate. Shangri La, the Honolulu residence of the American heiress and philanthropist Doris Duke, was built overlooking the Pacific Ocean and Diamond Head. Designed by architect Marion Sims Wyeth, Shangri La includes a main house, playhouse, caretaker's cottage, and extensive grounds. Both the buildings and landscape incorporate a wide range of materials. Wood was a component of the structures' roof and lanai framing, windows, and screens. To assist the project team in creating an interactive, dynamic Historic Structures Report, we divided the exterior systems according to staff expertise to evaluate the material components. The team could then cross reference and link data (existing conditions, significance, historic preservation objectives, and treatment recommendations) as the evaluations inevitably overlapped.

Keywords condition assessment, timber construction, historic structure, termites, defiberization, resistance drilling

1. BACKGROUND

Shangri La, the Honolulu, Hawaii residence of the U.S. American heiress and philanthropist Doris Duke, was built in 1937. Designed by architect Marion Sims Wyeth, Shangri La includes a main house, playhouse, caretaker's cottage, and extensive grounds (Littlefield 2002). Both the buildings and landscape incorporate a wide range of materials. Wood was a component of the structures' roof and lanai framing, windows, and sliding and stationary screens. The Doris Duke Foundation for Islamic Arts assembled a team to compose a Historic Structures Report (HSR). The team included

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building envelope specialists (the authors and colleagues from Simpson Gumpertz & Heger), architects, conservators, mechanical engineers, and cost estimators.

2. METHODOLOGY

Prior to commissioning the HSR, Shangri La already used museum-oriented database software intended for tracking the condition and care of their many art objects. The team provided the HSR data to them in an electronic form that could, with some conversion, be input into their existing software. To assist the project team in creating an interactive, dynamic HSR, we divided the exterior systems according to staff expertise to evaluate the material components. The team could then cross reference and link data (existing conditions, significance, historic preservation objectives, and treatment recommendations) as the evaluations inevitably overlapped.

Proper analysis/diagnosis of the cause of distress is essential to prescribing an appropriate treatment, and to avoiding a repetition of the problem (or worse, creation of a new problem). Hence, we included a section in the HSR for the discussion/diagnosis of the cause or likely causes of distress.

3. CONDITION ASSESSMENT OF WOOD IN THE MAIN BUILDING

Wood features at Shangri La are located throughout the property at the main house, the playhouse, the caretaker's cottage, and various structures on site. We performed condition assessments of over 38 wood features, many with multiple components or locations. This paper includes examples from the condition assessment. The examples focus on three types of wood deterioration mechanisms: salt damage, termite damage, and water damage from roof system integration. The examples highlight the interplay between team member expertise and evaluation overlap while addressing our specific observations, a discussion of the diagnosis, and our recommendations for repair and maintenance needs.

We listed recommendations in terms of the feature's chronological needs. Immediate concerns address a life safety hazard or represent a potential liability issue for the Owner. Immediate repairs represent building elements where ongoing deterioration is occurring and could be arrested by immediate intervention. Other categories included maintenance needs, repairs required within 5 years, and long-term repairs. Separating our recommendations chronologically identifies priorities for the Owner.

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