

**TENSEGRITY-BASED STRUCTURAL LANDSCAPE INTERVENTION FOR
CODEPENDENT REGENERATIVE DEVELOPMENT OF RHIZOPHORA
MANGLE HABITAT AND PROACTIVE LAND RECLAMATION SUPPORTIVE
OF HIGH-DENSITY URBAN CONDITIONS**

By
Keith Van de Riet

An Abstract of a Thesis Submitted to the Graduate
Faculty of Rensselaer Polytechnic Institute
In partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE
Major Subject: ARCHITECTURAL SCIENCES

The original of the complete thesis is on file
in the Rensselaer Polytechnic Institute Library

Approved:

Anna Dyson, Advisor

Jason Vollen, Reviewer

Pravin Bhiwapurkar, Reviewer

Rensselaer Polytechnic Institute
Troy, New York

January 2009
(For Graduation May 2009)

ABSTRACT

Analysis of the current global population distribution reveals major concentrations of urban density on or near coastlines and in tropical regions coinciding with mangrove habitat. Interruption of the mangrove's continuous and flexible root structure through implementation of static shoreline device is detrimental to the landscape's ability to resist erosion and displacement during tropical storm events, further exposing coastal communities to wave energy from climatic phenomena. If proactive land-grabbing coastal development occurring within tropical regions and associated with the rhizophora mangle (red mangrove) were inclusive of a flexible and continuous structural landscape interconnected with the building structural pile foundation system and demonstrative of the native vegetation performance characteristics, then human and environmental systems may coexist in a symbiotic landscape relationship. Medical and landscape grafting technologies provide insight to the regenerative capacity of biological systems initiated through human-

engineered intervention. The ability of grafting technologies to successfully address vital components of biological and landscape systems demonstrates a framework for viewing the urban condition with regards to native landscape characteristics. Examination of the ecological performance and structural characteristics of the mangrove landscape prior to development of the urban condition informs a systemic structural landscape intervention promoting distribution of wave energy and acting as substrate to biological habitats of the pre-existing landscape. The multiple scales of informant criteria necessitate interdisciplinary research in order to address the critical points of interjection within the experimental framework, while simultaneously developing a methodological approach for parametric response strategy. Key experimentation and continuing areas of inquiry include mechanical testing of flexible structural models, development of parametric criteria as response mechanism for design, and exploration of the architectural ramifications of the system.