DESIGN SPECIFICATIONS

GANGWAYS should be designed for a 50 psf live load. Normally a 3.5 to 4.0 foot width with handrails on each side is considered adequate. If a wider gangway is desired, larger design loads should be considered but should not exceed 100 psf. All gangways should be checked for deflection of each part. Extreme high and low water levels must be considered when computing the length of a gangway as the maximum angle should not exceed 18° for ease of walking. Handicapped requirements will reduce the maximum allowable slope.

FIXED PIERS should be used when water fluctuations are small enough to allow easy access to boats. Main walkways should be 6 to 10 feet wide and finger piers 2 to 4 feet wide. Normally the main walkway will be designed for a 50 psf live load unless golf carts are to be used, then 100 psf live load is recommended. Finger pier loading may be reduced from the main walkway's load for obvious reasons. Uplift design loads should be 75% of the normal loading. When possible, utilities should be located under the piers. Normally pile spacing can be 10 to 25 feet on centers depending on design loads.

FLOATING DOCKS should be used where large water fluctuations make access to boats a difficult task. Marginal walkways usually are 8 to 10 feet wide; main walkways are designed 6 to 8 feet wide with 5 feet being minimum; finger docks will normally be 3 to 4 feet wide. Live load requirements should be 20 psf under normal conditions. Freeboard requirements will vary from fresh to salt water marinas; with fresh water marinas (small boats) being about 18 to 20 inches for dead load and for salt water marinas (larger boats) being about 22 to 24 inches for dead load freeboard requirements. Under combined live and dead load conditions the freeboard should not be less than 8 inches. Flotation should supply linear support during submersion for safety. Anchor piles are generally used to anchor the system. These piles are placed at locations on the system to protect against potential failure due to a combination of wave, current, impact, wind, live and dead loads. Knee braces may be added at the connection points of intersecting walkways to provide extra strength and ease of access. Utilities should be installed under the docks and in accordance with all local agency codes. Additional flotation must be provided to the dock system where the gangway is placed on the dock to insure the proper freeboard requirement is met.

GENERAL items to be accounted for in the design of a marina system are the layout of the berths and the accessories. Double berths are popular because of economic reasons. The length of each finger dock/pier can be reduced by encouraging boaters to park "stern in". Accessories are required and should not be left off for economic reasons. Pile guides, cleats and fendering should be provided. Utilities, when used, can be purchased from numerous commercial manufacturers. Pile guides may be mounted on finger, main walkway docks, in knees braces, or in the dock itself. The guides may have rollers, blocks, be plain or just spud guides. Two cleats should be placed on each side of each finger dock and two cleats per boat on the main walkway. Either marine vinyl fenders or treated wood 2 x 10 works well as does fire hose or rubber bumpers.

The above mentioned Design Suggestions are to be used in an advisory manner for your marina design. Competent design professionals should be hired to provide the owner with his exact needs. For additional specifications or designs please call RAVENS MARINE, INC. at 407-935-9799; (800) 676-3023; Fax 407-935-9436.

PRESTRESSED CONCRETE FLOATING BREAKWATER UNITS and docks are used where all other materials are too light to handle heavy sea and moving water conditions.

Two analyses are needed at each floating breakwater location to determine proper unit combinations to solve wave problems. They are the hydrodynamic and the structural restraint analysis. The hydrodynamic analysis studies the motions of a prismatic floating breakwater in monochromatic waves striking normal to the axis of the breakwater. The structural restraint analysis, including slack or taut chains, synthetic lines or rigid piles, yields the motions of the body-mooring system, from which the desired wave amplitudes, pressures, stresses, and body motions may be calculated.