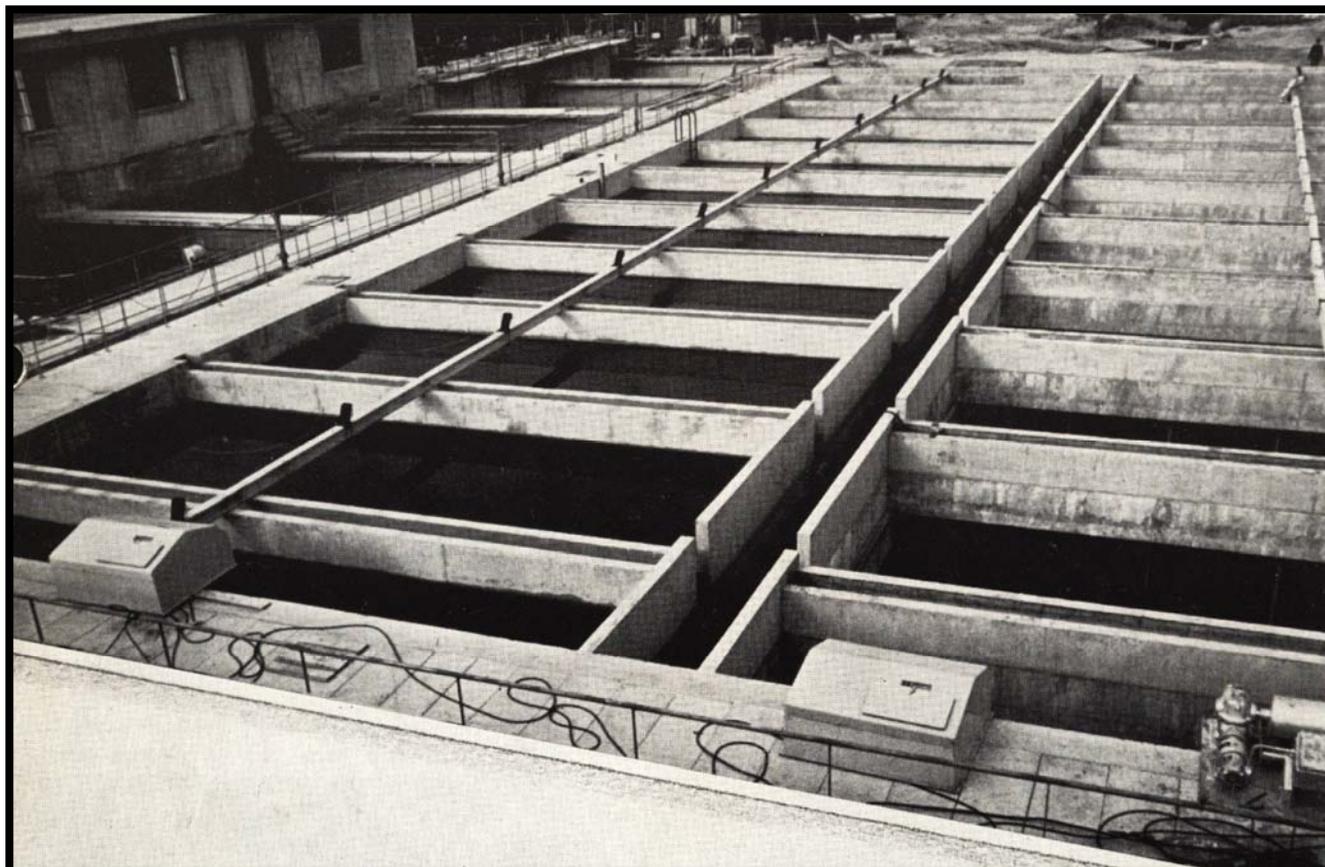


FLAT BOTTOM CLARIFIER



A highly competitive, sludge blanket clarification system designed on modular principles for large water treatment plants.



ADVANTAGES

| | |
|--|--|
| <ul style="list-style-type: none">▶ High performance | <ul style="list-style-type: none">▶ Automatic, controlled discharge of blanket sludge without water wastage |
| <ul style="list-style-type: none">▶ Low Civil costs – a simple, flat bottomed rectangle tank with vertical walls▶ No external power requirements or separate flocculation equipment | <ul style="list-style-type: none">▶ Unobstructed tank floor allows easy cleaning – or the installation of an intermittent scraper for use on very silty waters |
| <ul style="list-style-type: none">▶ Suitable for a wide range of raw waters | <ul style="list-style-type: none">▶ Consistently high sludge concentration |

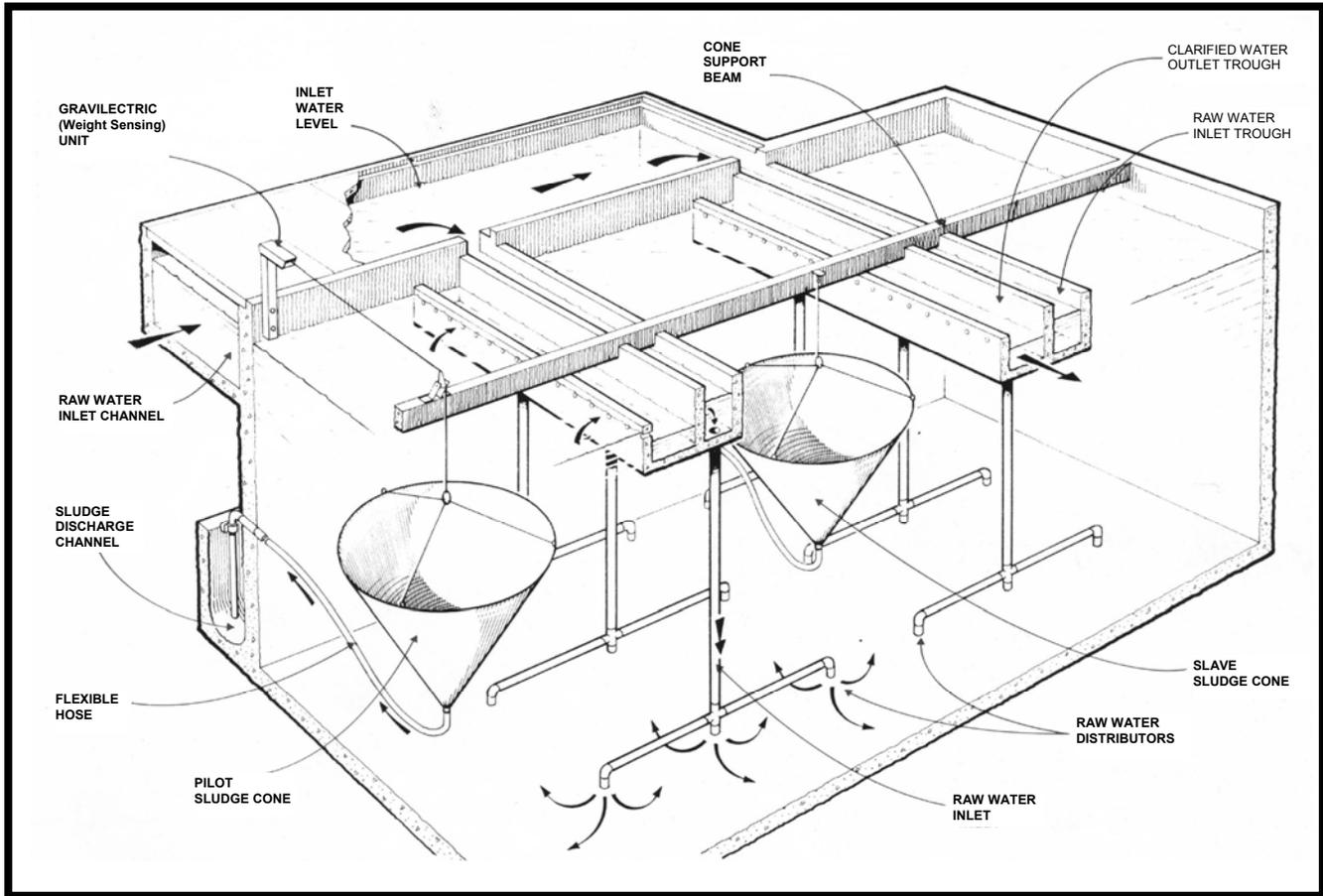
PCI AFRICA

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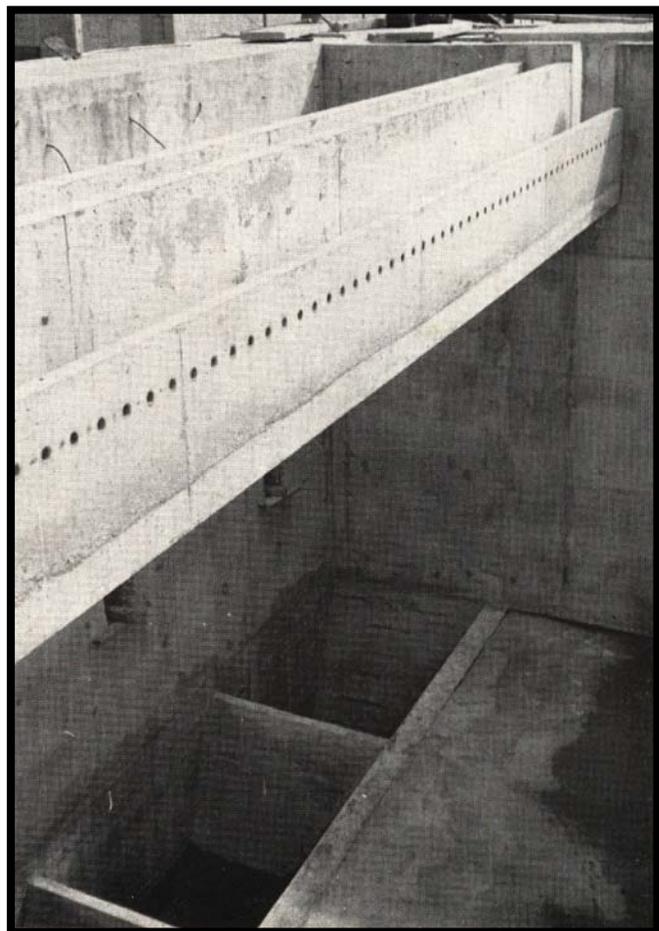
PROCESS

The flat-bottomed clarifier is closely related to the familiar hopper-bottomed sludge blanket clarifier and is virtually identical in many aspects of its performance.

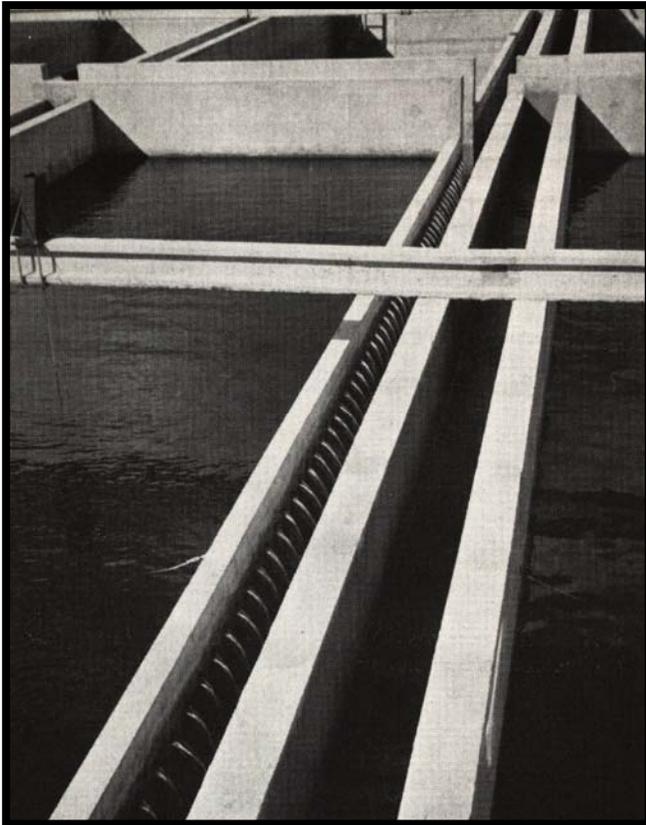
PCI evolved the flat-bottomed clarifier from their established hopper tank design. Multiple-hopper tanks have been built without intervening dividing walls, some with mini-hoppers covering the entire tank floor. With type of clarifier and its natural development, the flat-bottomed tank, the sludge blanket is entirely stable in behaviour with negligible horizontal flow occurring.

Raw water, mixed with coagulant, is injected through a matrix of inlet diffusers situated above the floor of the clarifier. The incoming water flocculates in the lower section of the tank and passes upwards through the blanket, enabling virgin floc particles in the raw water to be captured by the larger, more mature, particles in the established blanket. The blanket itself forms a level upper surface, which is regulated by special de-sludging hoppers suspended at intervals across the tank.

The flat smooth floor means that it is a simple matter to drain the tank once or twice a year and hose the floor clean.



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View along a raw water inlet trough with a clarified water outlet trough to the left

Where the raw water regularly carries heavy silt in suspension a simple, single-bladed scraper can be installed to sweep the clarifier floor, depositing the silt into small hopper pockets at one end of the tank. Scraping is normally initiated manually and, depending upon raw water quality, frequency of operation may range from one sweep per day to one per month.

Blanket De-sludging

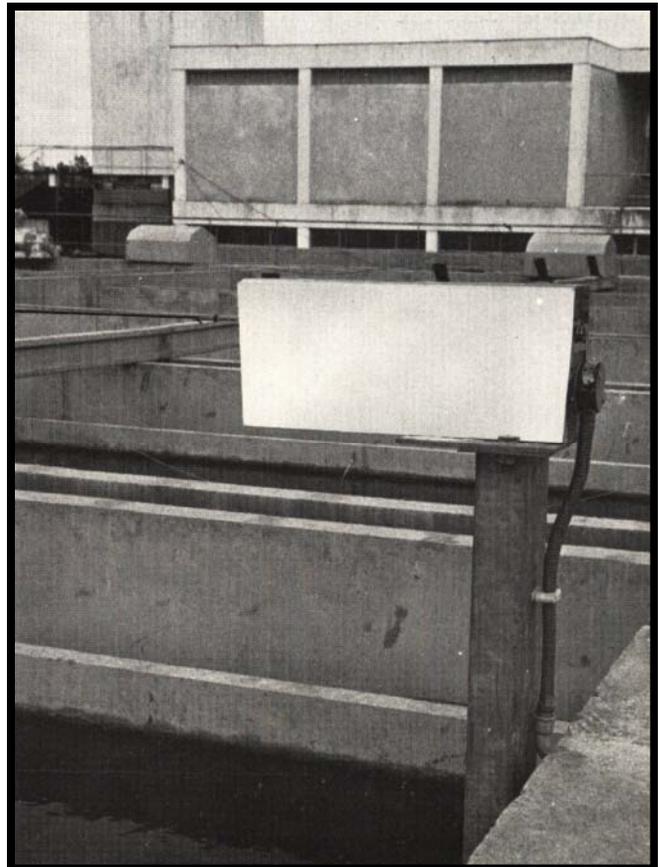
PCI's patented "weight sensing" sludge concentrator is the key to the efficiency and high rating of flat bottom clarifiers.

Simple cone-shaped flexible sludge concentrators are installed throughout the tank, with their rims at the upper surface of the blanket. One or more of the flexible cones is suspended from a load cell which initiates de-sludging of all cones simultaneously when the weight of concentrated sludge gathered in the pilot cone falls to a set level. Hence de-sludging frequency adjusts automatically to the rate of floc formation (i.e. to raw water turbidity and flow rate). This "Gravilectric" de-sludging system has been approved in numerous installations throughout the world and is now commonly applied as an up-rating modification to existing blanket clarifiers, commonly increasing the throughput by a factor of 2 or more.

Rise Rates and Turn Down Ratio

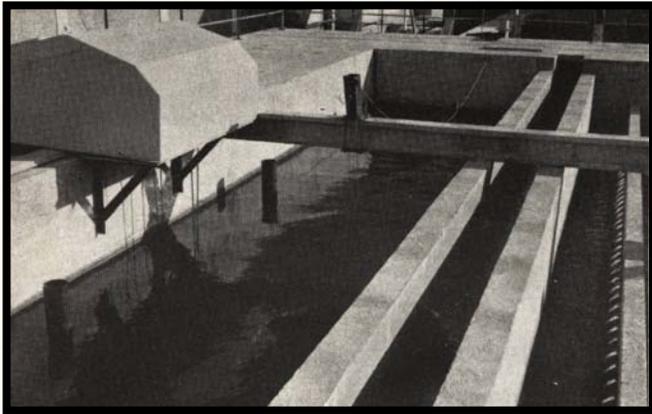
The rise rate is comparable to that of PCI's established hopper bottomed clarifiers, ranging from 2 to 4 meters per hour (depending upon raw water characteristics) using conventional coagulants; and up to 6 meters per hour or more with the aid of polyelectrolytes.

The minimum operating flow is that which will just suspend the blanket. Maximum flow is limited by the extreme expansion of the blanket. Typically, the ration of minimum and maximum floats is three to one. As with all sludge blanket clarifiers, the use of polyelectrolytes enables the maximum flow rate to be increased, however, as polyelectrolytes also raise the minimum flow rate. The turndown ratio can be increased by discontinuing coagulant aid dosing at low water flow rates.



A single "Gravilectric" load cell controls the mass balance of the sludge blanket via pilot and slave flexible cone sludge concentrators.

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Drive unit for the single-bladed silt scraper

Raw water troughs bridging the tank at intervals carry suspended pipes, feeding the distributors. These troughs are open topped and are sufficiently broad to enable them to be hosed clean when necessary. Clarified water decanting troughs are situated alongside the raw water troughs and carry the treated water to the clarified water outlet channel.



Raw water troughs, carrying the support beam for the flexible cone sludge concentrators

CONSTRUCTION

The clarifier tank is a simple, straightforward, rectangular, vertical sided structure with a level, flat bottom. Small inverted pyramid sludge pockets will be incorporated at one end of the tank in those instances where a scraper is to be installed. In some cases, existing horizontal flow settlement tanks may be suitable for conversion to flat bottomed clarifiers with enormous increases in throughput potential.

The raw water inlet channel normally runs the length of one side of the tank while the clarified water channel is situated on the opposite side.

Because of simplicity of civil construction, ease of operation and control, insensitivity to changing raw water turbidity, and simple maintenance. PCI's flat bottom clarifier is a competitive, respective, proven challenger to the best clarification systems currently available worldwide.

Progressive changes in design and specification may be made without prior announcement

