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Makata pumpable VIP latrine block

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Introduction

The Makata Style pumpable VIP Latrine Block is a block of twelve latrine stalls and four urinals combined in one structure. Each stall has its own concrete squatting slab, its own pit, and its own vent pipe with attached flyscreen.

This latrine block was designed specifically for a crowded urban setting where a lot of latrines need to be provided. A standard septic tank pumper truck or another method of removing the excreta out of the two meter deep pit must be available if this style is to be used.

An extensive survey of Blantyre, Malawi's existing primary school latrines and toilets was done while the Makata Latrine Block was being designed. Lessons learned from that survey shaped the design of this latrine especially in the many small but significant design details.

Some of the reasons this system might be chosen over other designs are:

- This system isolates all waste matter *including* the water used for cleaning the latrine which is often neglected in other block designs.
- This design saves space. This feature is especially desirable in urban situations where schools are overcrowded and land is needed for future building extensions or playing fields.
- Residents of urban areas find the single attractive building more acceptable than standard individual latrines which may be seen as a step backward.
- The Makata block latrine uses strong, basic materials and calls for a very high quality finish. It is therefore very long lasting and requires little maintenance.
- The relatively shallow pit design can be built in an area with poor soils where a deeper excavation would normally need to be braced and shuttered.

Other features of this latrine are:

- Extremely low maintenance costs.
- Pumpable with normal septic tank pumper trucks.
- Uses basic materials that can be found in most local hardware stores.
- Low operating costs consisting only of pumping costs and the water used for washing the floors. The pits need to be pumped out about every two years. Each pit has a capacity of 5.8 cubic meters.

- Uses modular pre-cast concrete blocks to make the vent pipes.
- Having facilities all in one place makes cleaning easy.
- Virtually theft proof.
- The material cost is only about 35% higher on average than an equivalent number of individual latrines but the Makata style latrine can be expected to last far longer.

Major problems to avoid

The design *details* of this system set the Makata style latrine apart from more basic designs. These details were developed from our experience in the field. Before designing this latrine every toilet and latrine in the City of Blantyre's Primary School System was inspected to get an idea of what worked and what didn't work in the existing facilities. These details were developed to avoid the problems that were discovered in this survey.

Standing water inside of buildings

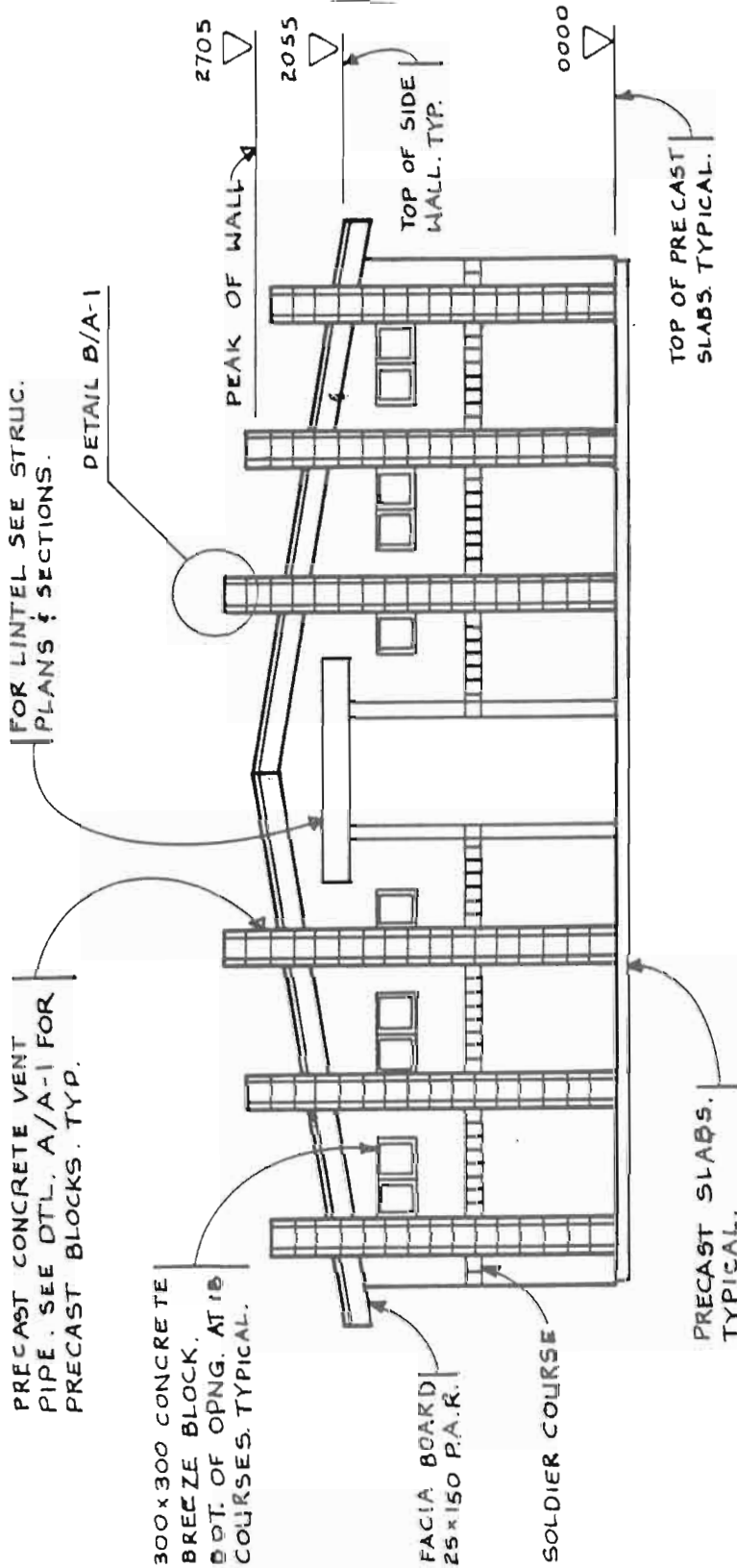
This problem is usually caused by poor design. Most facilities in the survey lack floor drainage or are poorly constructed. The result is that low spots in the floors become puddles of filthy water that can remain for days. This water is a problem because diseases breed and live in it. They can then be passed on to the many people who come walking through the facility.

Muddy, wet areas outside the entrances and exits to latrines and toilets

This situation occurs if the designer fails to put an apron, sidewalk or drain at the doorways to the latrine or toilet facilities. Wet, muddy places pose the same problem as standing water.

Foul water draining into areas nearby the latrine

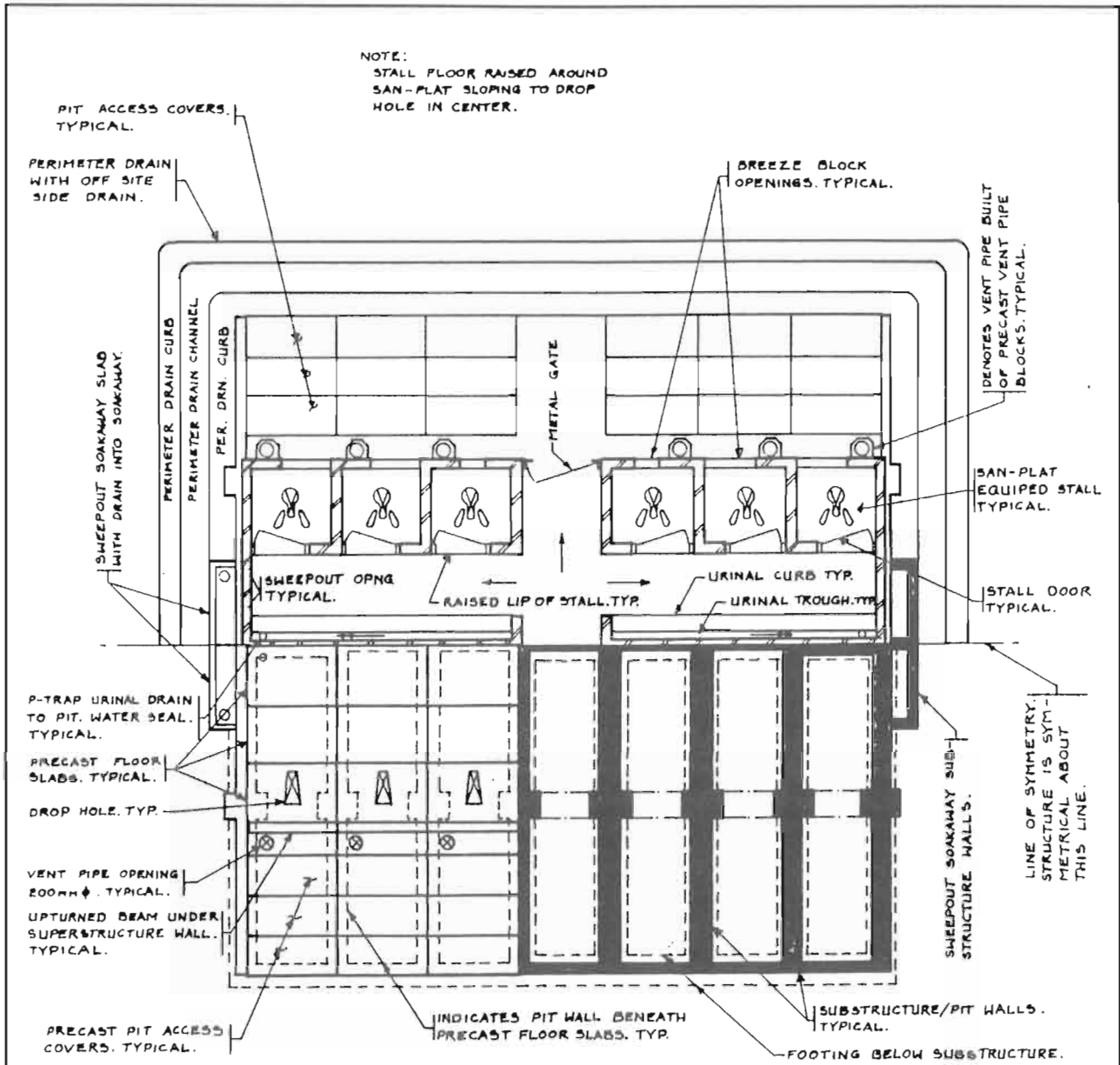
Since there are often no floor drains or soakaways provided to collect fouled cleaning water, that water is, by necessity, swept out the building only to find its way into a nearby road, path or residence. This poses health threats for the students as well as people who pass by or live nearby. The problem can be avoided by using a soakaway.



FRONT & REAR ELEVATION. 1:50

CITY OF BLANTYRE
 TECHNICAL SERVICE DIVISION
 MAKATA STYLE PUMPABLE V.I.P. LATRINE BLOCK
 FRONT: REAR ELEVATION

A-2



DESIGN ELEMENTS PLAN

1. SUPERSTRUCTURE DENOTED THUS:
2. SUBSTRUCTURE DENOTED THUS:
3. FLOOR SCREED SLOPES 1:75 IN DIRECTION INDICATED THUS:
4. URINAL TROUGH SLOPES 1:50 IN DIRECTION INDICATED THUS:
5. BRICK FOOTING AT PIT WALL PIERS DENOTED THUS:
6. ALL INTERIOR WALL SURFACES TO HAVE SMOOTH TROWEL FINISH BELOW ELEV. 1875.



<p>CITY OF BLANTYRE TECHNICAL SERVICE DIVISION MAKATA STYLE PUMPABLE V.I.P. LATRINE BLOCK DESIGN ELEMENTS PLAN</p>	X-1
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Stalls and corridors that are too large

Stalls and corridors that are too large encourage children to defecate indiscriminately in those areas.

Excessive darkness and poor ventilation

The problems mentioned above of children defecating everywhere except for in the toilet or latrine is worse in facilities that are too dark. Young children who are sometimes afraid of dark places and are often the worst offenders. They defecate in the corridor rather than risk going into the dark stall. Adding breeze blocks as windows in each stall and large open metal gates at the two entry ways brightens this design. This increased light has not in anyway increased fly breeding. These improvements have the added benefit of allowing more air into the latrine which helps to dry the floor out between uses, killing off disease vectors that live only if water is present. Toilet and latrine floors should dry out completely at least once a day.

Design details

The following design details were conceived to prevent the problems listed above:

One pit, one vent pipe, one drophole

This main principle behind the Makata latrine's design is the same as the basic principle of the standard VIP Latrine design. For every squatting slab there must be a vent pipe and a separate pit. In other block latrines where one large pit is used for several squatting slabs the latrine doesn't vent well and so the smell can be quite offensive. In this design there are twelve separate latrine stalls and four urinals. Therefore, for one latrine block there are twelve squatting slabs and twelve vent pipes in the superstructure and twelve separate pits in the substructure.

Sweep-out opening and soakaway for cleaning water

At the end of the corridor there is an opening through the side wall at the floor level. The water used to clean the floor is swept out the opening. Many designs make no provision for getting rid of this water and so the cleaner sweeps it out the entrance or exit creating a dangerous mix of water and disease where everyone is sure to step. Care is taken to insure that the floor in the corridor is well sloped. This insures that all of the water in the corridor leaves through the sweep-out and there is no chance of water standing inside.

Next, a soakaway has been provided adjacent to the building to safely isolate this water. The soakaway is quite narrow in order to prevent rainwater from the roof from pouring into it. The cleaning water runs through the building wall and immediately into this soakaway. This feature solves both the problem of standing water inside the building and of water running onto adjacent areas.

Exterior drainage

Exterior drains all around the building shed the water that collects from the roof, and intercepts rainwater that may flow toward the building. The drains also shed any water that is used to clean the inside or outside of the latrine and is not intercepted by the soakaway.

Small stall and corridor sizes

In the pre-design survey it was found that if the stall was too big, larger than one square meter, children would often not use the drophole but instead would defecate in the open space or in the corners. The smaller sized stall has worked really well to solve this particular problem. For the corridors the same problem exists. When the corridor is too wide or if there is a large open area, which is common with waterborne toilets, children are often found urinating or defecating in these places. By decreasing the corridor size, getting rid of unnecessary area and by eliminating blank walls from the boys latrine by providing urinals instead, this problem has been solved. By making the corridor smaller the traffic in the latrine effectively makes it impossible to misuse the corridor. It is easier to use the facility correctly than to misuse it.

Squatting slabs

The squatting slab is a standard feature in most VIP Latrines. It is a small, hard concrete slab with a keyhole drophole and strategically placed, raised footrests. It is easy to clean as the floor slopes toward the drophole. A lid is not recommended in this application.

If you want plans or other information about the Makata Latrine write to Stewart V Dohrman, 3604 Trail Ridge Rd., Louisville Ky 40241, USA or Alexander Abel, 310 Lookout View Ct., Golden Colorado 80401, USA or the San Centre Supervisor, Post Bag 67, Blantyre, Malawi.