Final Draft For Field-Testing

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GUIDELINES

FOR THE IMPROVEMENT OF SCHOOL SANITATION



Part 3:

Operation and Maintenance of School Sanitation

Technologies covered:

- Direct single pit latrine
- Direct double pit latrine
- Single offset pit pour-flush latrine, optional with soak-away

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- Double offset pit pour-flush latrine, optional with soak-away
- Pour-flush latrine with 2-chamber septic tank with either soak-away, drainage field or evapotranspiration mound
- Urinal
- Latrine superstructures

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International Water and Sanitation Centre



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International Training Network Centre for Water Supply & Waste Management

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- Latrine superstructures

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INTRODUCTION

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This *Guide Phase 3* helps the School Management Committee in the operation and maintenance of their improved school sanitation facilities.

The *Guide Phase 3* assists the School Management Committee (SMC) in planning, supervising and monitoring the operations, and also the maintenance including repairs of latrines, pits and urinals.

1. OPERATION AND MAINTENANCE OF SCHOOL LATRINES

Introduction

To achieve a good hygiene level at school first of all the latrines must be in a good functional state, and they must be used by all students and teaching staff both for defecation and for urination. To keep the latrines functioning, we must keep them clean, do daily cleaning, prevent blockages and do any required maintenance in time and correctly. This usually needs small efforts and small investments; the effects are big in terms of convenience, comfort, cleanliness of the school environment and reduction of disease risks.

Latrines are only effective if all staff and students use them whenever needed. There will then be no open defecation and urination anymore. The latrines must give the users sufficient privacy and protection against the weather. Girls and female teachers need their own latrines to feel safe and comfortable. Their latrines must be seen from the classrooms. If the school has such proper latrines, all boys and girls will be encouraged to always attend the school. The absence of a proper sanitation facility is not there anymore as a reason not to attend the school.

There can only be a positive effect on personal health from improved school sanitation if all students and school staff practise good hygienic and sanitation behaviour. Therefore, wherever possible hygienic and sanitation behaviour and practices must be linked to and built as a permanent issue in school curriculum of hygiene and health, environmental sciences etc. For instance, hand washing should be seen as an integral part of using the latrine and the operation of the latrine. Posters or drawings from students (result of a contest or from the School Health Clubs) can be put in the classroom and inside the latrines. On the walls of the latrine buildings (in and/or outside) the School Health Club can paint colourful illustrations of proper hygiene behaviour.

GOAL

To keep our sanitation facilities in such a good shape that they will continue functioning and will be used always by all boys and girls students and male and female school staff.

ISSUES

- □ How to properly operate the school latrines?
- How to properly maintain the school latrines?
- Linkage of operation and maintenance to school curriculum and activities of the School Health Clubs

2. **OPERATION OF SCHOOL LATRINES AND URINALS**

The cleaning of the toilets should be the responsibility of the users themselves, not just the cleaners. For instance, students from higher classes can be made responsible to clean the latrines in shifts. Even contests can be organised to award the class/team doing the best job. Within the class, the tasks can be divided over the week among teams of boys and girls students. They are also responsible to daily lock and unlock the latrines. Leaving the doors unlocked during the night may invite outsiders to soil or incorrectly use the latrines.

Students and/or the School Health Club should look after the hand-washing facilities, i.e. cleaning the site, making sure there is sufficient water and soap (or ashes), and make sure the drainage works properly.

Key issues that need attention in the operation of the latrines and urinals:

- 1. Use
- 2. Cleansing
- 3. Daily cleaning
- 4. Weekly cleaning
- 5. Check of sludge level in pit
- 6. Alternating use of the pit systems
- 7. De-choking of pipes
- 8. Measures in case of high flood levels (above slab level)
- 9. Record of operation costs

These key issues that need special attention in the operations of latrines are worked out in the table below. The two common systems, Direct Pit latrines and Offset Pour-flush latrines have been separated because some operational issues are different. The special operational issues for double pit systems are also highlighted.

Operational tasks Daily Proper use by all users Noon-cleaning Evening cleaning Emptying of sanitary bucket Weekly Thorough cleaning in and outside Monthly Check sludge level in pits Check water level in soak-away Close off full pits and start using other pit Undetermined period De-choking of pipes Measures in case of high floods Records of operational costs

Operational schedules:

2.1 Operational issues for the latrines

Table describing the operational issues needing attention in school latrines

For DIRECT PITS SYSTEMS	For POUR-FLUSH SYSTEMS				
♦ Use	◆ Use				
Before use poor a little amount of water to wet the drop hole or pan. The urine and excreta will then easily flow into the pit. Do not pour water after use in the pan; the pit must remain as dry as possible. Do not throw lighted cigarette butts in the pan. → Hand-washing: Always wash hands with soap or ashes after latrine use at the assigned place.	 Before use poor a little amount of water to wet the pan, and so also the drainpipe. The urine and excreta will then easily flow into the siphon and from there after flushing to the pit. Pour after use the remaining water from the can in the pan. The pourflush systems need some 1.5-2 I of water to flush the excreta into the pit. Flush the latrine after each use. After urination, a small amount of water should be poured in the pan, but always less than 0.5 litre. Two cans should be available for each latrine, one of 2 litres for defecation and one of 0.5 litre for urination. Do not throw lighted cigarette butts in the pan. Hand-washing: Always wash hands with soap or ashes after latrine use at the assigned place. 				
→ Cleansing	Cleansing and pour-flushing				
For cleansing the use of water is very common except where water is a problem. This cleansing water will come from the 0.5-litre can also used to wet the pan. In madrasas, mud balls are commonly used for anal cleansing. Others use paper of any kind or any other material. Mud balls, paper etc. can be put in the pit but they make the pit to fill quickly. If such cleansing materials are used, it is better to throw them in a plastic bucket with cover placed inside the latrine. Provide in the girls' latrines a small closed bucket for disposal of sanitary napkins. → Do not throw cigarette butts, fruit peelings, cotton waste, sanitary napkins etc. in the pan.	For cleansing the use of water is very common except where water is a problem. This cleansing water will come from the 2-litre can; the remainder is used for flushing. In madrasas, mud balls is commonly used for anal cleansing. Others use paper of any kind or other materials. Mud balls, paper etc. can not be put in the pan; they will choke the drainpipe very quickly. If such cleansing materials are used a plastic bucket with cover must be placed inside the latrine. Provide in the girls' latrine a small closed bucket for disposal of sanitary napkins. → Do not throw cigarette butts, fruit peelings, cotton waste, sanitary napkins etc. in the pan or waste.				
Daily cleaning	→ Daily cleaning				
Because of the intensive use, the inside of the latrine and pan needs to be cleaned twice a day. The first time is around noon. The latrine must then be cleaned with some water only using a soft brush with a long handle. In the evening, after classes, the latrine has again to be cleaned with water and a bit of detergent powder. Not more than 1.5 - 2 litres of water should be used per cleaning. A plastic water bottle or can could be used to limit the amount of water used. <i>The amount of water entering the pit must be kept low</i>). If a plastic waste bucket is present for disposal of cleansing materials, this must be emptied twice a day in a deep waste pit and covered with some sand.	Because of the intensive use and the possible choking, the inside of the latrine and pan needs to be cleaned twice a day. The first time is around noon. The latrine must then be cleaned with some water only using a soft brush with a long handle. In the evening, after classes, the latrine has again to be cleaned with water and a bit of detergent powder. Not more than 5 litres of water should be used per cleaning. If a plastic bucket is present for disposal of cleansing materials, this must be emptied twice a day in a deep waste pit and covered with some sand.				

Weekly cleaning	Weekly cleaning
	· Weekly Geanning
At the end of the week, the latrine and its surroundings should be thoroughly cleaned. Spider cobs and strain waste should be removed and some more than the daily amount of detergent or bleaching powder can be used on the surface of the latrine floor and pan. All collected solid waste must be properly disposed in the school waste pit.	At the end of the week, the latrine and its surroundings should be thoroughly cleaned. Spider cobs and strain waste should be removed and some more than the daily amount of detergent or bleaching powder can be used on the latrine floor and pan. All collected solid waste must be properly disposed in the school waste pit.
Check sludge level in pit	Check sludge level in pit
It may take some time before the sludge level comes within a metre from the floor/slab. But for hygienic reasons the sludge level should never be closer to the slab than 0.5 metre. Therefore, when the level is less than 1 metre, it has to be checked weekly.	It may take some time before the sludge level in the offset leach pits comes within 0.5 metre from the level of the inflowing or drainpipe. To avoid problems in flushing and choking of the drainpipe from the pan, the sludge level should never be closer to the drainpipe than 0.25 metre. Therefore, when the level is less than 0.5 metre, it has to be checked weekly.
For single direct pits: When the sludge level is 0.5 m from the slab, the sludge has to be removed. But since the sludge is partly fresh and therefore unsafe, it is better to remove the sludge yearly at the end of the dry season and preferably at the end of the holiday period because then the amount of fresh faeces is limited. See further Maintenance section	For single offset pits: When the sludge level is 0.25 m from the drainpipe, the sludge has to be removed. But since the sludge is partly fresh and therefore unsafe, it is better to remove the sludge yearly at the end of the dry season and preferably at the end of the holiday period because then the amount of fresh faeces is limited. See further Maintenance section
For double direct pits: When the sludge level is 0.5 m from the slab, the full pit must be closed off with some soil and the drop hole sealed, and the other pit is to be used from then on. See further alternating use of double direct pit system.	For double direct pits: When the sludge level is 0.25 m from the drainpipe, the full pit must be closed off with some soil and the drainpipe sealed at the diversion box, and the other pit is to be used from then on. See further alternating use of double offset pour-flush system.
	♦ De-choking of pipes
	When the water does not drain from the pan after flushing, either the siphon, the drainpipe to the pit or the one to the soak-away got choked or the pit is full (but this we would have seen if we check regularly, see previous operation point). By removing the pit cover (using two poles placed through the lifting handles) we can see whether the pit is full or if the drainpipe to the soak-away is choked. If the pit is full, we have to empty it (single offset pit system) or shift to the second pit (in case of double offset pit system). (See also Maintenance: pit emptying). If the drainpipe to the soak-away is choked, remove the blockage by carefully putting a split bamboo stick in the drainpipe from the pit side. This should solve the problem. It can also be tried from the soak-away side.

	If the drainpipe from the latrine is choked, we can remove the blockage by carefully putting a split bamboo stick with a cloth wad tight on one end in the drainpipe from the pit side. This usually solves the problem. Do not do this from the pan, as you will damage the siphon and so the water seal. If this does not solve the problem, a thin flexible bamboo stick could be carefully pushed in from the pan side. Make sure you do not damage the siphon or water seal!
Alternating use of double direct pit system	Alternating use of double direct pit system
Principle of alternating pit system: Only one pit is to be used at any time! This is very important for the proper functioning of the twin pit. When one pit is full, the flow is directed to the other one and the full one left so that content can decompose by digestion over a period of at least 18 months. During this time the microbiological, chemical and thermal activities in the sludge render it safe. That means that after that period the content (humus) is free of disease-causing organisms. So when being emptied, there is no health risk at all. The humus will also be free of foul smell. The humus can be bailed out and used as fertiliser on the fields. This emptying is best done at the end of the dry season, as we can then expect that the content is dry. If the pit content is not dry, as in areas with very high water tables, we can not be fully sure that the content is 100% safe. This wet content is best dried in the sun before applying to the field to make it safe for human handling.	Principle of alternating pit system: Only one pit is to be used at any time! This is very important for the proper functioning of the twin pit. When one pit is full, the flow is directed to the other one and the full one left so that content can decompose by digestion over a period of at least 18 months. During this time the microbiological, chemical and thermal activities in the sludge render it safe. That means that after that period the content (humus) is free of disease-causing organisms. So when being emptied, there is no health risk at all. The humus will also be free of foul smell. The humus can be bailed out and used as fertiliser on the fields. This emptying is best done at the end of the dry season, as we can then expect that the content is dry. If the pit content is not dry, as in areas with very high water tables, we can not be fully sure that the content is 100% safe. This wet content is best dried in the sun before applying to the field to make it safe for human handling.
<i>How to use one pit at the time?</i> The use of one pit at the time is achieved by completely sealing the drop hole of the pit not in use. This sealing is done by putting a pipe stopper (e.g. a gunny bag) in the drop hole and by putting a small concrete slab over the drop hole. The slab is best put in lean plaster to properly close off the drop hole.	How to use one pit at the time? The use of one pit at the time is achieved by completely sealing the drainpipe going to the pit not being used. This sealing is to be done in the junction/diversion chamber where to flow of faeces from the latrine can go to either pit. A special pipe stopper can be installed to block the flow. → Never use two pits at a time!
→ Never use two pits at a time!	
 Measures in case of high flood levels (above slab level) 	 Measures in case of high flood levels (above slab level)
In case of high flood levels, the drop hole/pan opening should be sealed by pushing a strong plastic or gunny bag filled with fine sand partly in the drop hole. Heavy stones or concrete blocks should be put on the covers of the pits and the concrete slab over the closed drop hole (not in use). These measures will prevent excreta and liquids to flow out of pans and pits and so heavily contaminating the direct school environment and parts of the nearby village.	In case of high flood levels, the hole/pan opening should be sealed by pushing a strong plastic or gunny bag filled with fine sand partly in the drop hole. Heavy stones or concrete blocks should be put on the covers of the pits and the concrete slab over the closed drop hole (not in use). These measures will prevent excreta and liquids to flow out of pans and pits and so heavily contaminating the direct school environment and parts of the nearby village.

Record of operational costs	Record of operational costs
An overview of the operational costs should be kept	An overview of the operational costs should be kept
in file, if that is not done in the general school	in file, if that is not done in the general school
expenditure overview yet. Common expenditures	expenditure overview yet. Common expenditures
would include costs for bucket, water cans,	would include costs for bucket, water cans, detergent
detergent powder, brushes etc. (see example of	powder, brushes etc. (see example of table under
table under maintenance)	maintenance)

2.2 Operational issues for the urinal

Use of urinal

Pour not more than half a litre of water in the urinal after each use. Do not throw cigarette butts, paper, plastic, fruit peelings etc. in the urinal. Always wash hands with soap or ashes after urinal use at the assigned place.

• Daily cleaning

Because of the intensive use and the possible smell, the urinal needs to be cleaned twice a day. The first time is around noon. The urinal must then be cleaned with some water only using a soft brush with a long handle. In the evening, after classes, the urinal has again to be cleaned with water and a bit of detergent powder. Not more than 3 litres of water should be used per cleaning.

• Weekly cleaning

At the end of the week, the urinal and its surroundings should be thoroughly cleaned. Spider cobs and strain waste should be removed. Spread detergent or bleaching powder on the surfaces of the urinal (some more than the daily amount). All collected solid waste must be properly disposed in the school waste pit.

De-choking of pipes

When the urinal does not drain properly anymore, then it is most likely that the drain got choked. Remove the sieve over the drainpipe and put a flexible thin bamboo stick to push the blockage through. This can also be done from the soak away end.

Maintenance of school latrines and urinals

Three issues need attention in the maintenance of the latrines and urinals:

- 1. Regular emptying of the pit
- 2. Regular maintenance of latrine building, urinal and pit
- 3. Repairs and possibly replacement of latrine, urinal or pit parts

These key issues that need special attention in the maintenance of latrines are worked out in the table below. The two common systems, **Direct Pit latrines** and **Offset Pour-flush latrines** have been separated because some maintenance issues are different. The special maintenance issues for **double pit systems** are also highlighted.

Table describing the maintenance issues needing attention in school latrines

For DIRECT PITS SYSTEMS	For POUR-FLUSH SYSTEMS
Regular emptying of the single pit (of the	 Regular emptying of the single leach pit
single direct pit system)	Once every 12 to 24 menths the pit people to be
Once eveny 12 to 24 months the pit needs to be	emptied Best is 24 months as then most of the
emptied Best is 24 months as then most sludge of	sludge will be decomposed. It is recommended to do
what we will remove, will be decomposed. It is	the emptying activity just a few days before the
suggested to remove only the "old" sludge that is	school year will start again, i.e. the beginning of
directly under the concrete manhole slabs and not	January. As this is also during the dry season, we
the sludge under the drophole. It is recommended to	can then expect that the content will be relatively dry.
do the emptying activity just a few days before the	As no new excreta has nown in into the pit for some
January As this is also during the dry season we	stabilised
can then expect that the content will be relatively dry.	
As no new excreta has flown in into the pit for some	→ But the sludge is not yet safe to handle, there
weeks, the sludge will look more composed and	will still be a lot of disease-causing micro-
stabilised.	organisms in the sludge; so extreme care
N. Dut the eludronic wet and a to be well there	must be taken.
But the sludge is not yet sale to handle, there mov still be disease-causing microorganisms	Romova the cover of the pit by putting two polos
in the sludge: so extreme care must be taken.	through the lifting handles, and place is carefully
	aside so that it does not get damaged. Using a
Remove the concrete cover slabs of the pit by putting	bucket or a scoop, the pit content can be removed
two poles through the lifting handles, and place is	from the pit. Be careful not to damage the concrete
carefully aside so that it does not get damaged.	walls of the pit. When the job is done, carefully put
Using a bucket or a scoop, the pit content can be	the cover back in its position.
masonov walls of the pit. When the job is done	The sludge can best be buried in a temporary pit dug
carefully put the cover back in its position.	close to the latrine but also a place where students
The sludge can best be buried in a temporary pit dug	are not allowed to come (for safety reasons).
close to the latrine but also a place where students	Another option is to have this pit outside the school
are not allowed to come (for safety reasons).	premises at a safe place. The sludge can be
Another option is to have this pit outside the school	transported with buckets or container placed on a
transported with buckets or container placed on a	during the transport. The temporary pit must be
wheelbarrow. There should be no spillage of sludge	covered with soil. This sludge will have turned in safe
during the transport. The temporary pit must be	humus after another 12 months and can be used as
covered with soil. This sludge will have turned in safe	fertiliser.
humus after another 12 months and can be used as	
tertiliser.	→ Always wash hands with soap or ashes after
Always wash hands with soon or ashoe offer	emptying the pit at the assigned place.
emptying the pit at the assigned place.	

Regular emptying of the pits of a double direct pit system

Some 12 to 24 months (best 24 months) after the second pit has started to be in use, the first pit needs to be emptied. This emptying is best done at the end of the dry season, as we can then expect that the content is dry. Remove the concrete manhole covers of the first pit by putting two poles through the lifting handles, and place is carefully aside so that it does not get damaged. Remove the pit content by using a bucket or a scoop. Be careful not to damage the masonry walls of the pit. Remove as much humus from the walls and bottom as possible. Rake the bottom of the pit to increase the infiltration capacity again. Then carefully put the cover back in its position.

If there is water in the pit and the humus is not dry, then there may still some pathogenic microorganisms present in the humus. Handle the humus then with great care.

The dry humus can be used as fertiliser on the fields. It is definitely free of disease-causing organisms and there is no health risk at all.

→ Always wash hands with soap or ashes after emptying the pit at the assigned place.

great care.

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→ Always wash hands with soap or ashes after emptying the pit at the assigned place.

Regular maintenance of latrine building and Regular maintenance of latrine building and ٠ pits pits Regular maintenance includes painting of the door Regular maintenance includes painting of the door and whitewashing of the inside of the latrine. and whitewashing of the inside of the latrine. Painting needs to be done once every five years, Painting needs to be done once every five years, provided the door when delivered was properly provided the door when delivered was properly painted with red lead paint (for metal doors) or with painted with red lead paint (if metal doors) or with primer (for wooden doors). Whitewashing of the primer (for wooden doors). Whitewashing of the inside walls needs to be done once a year. The inside walls needs to be done once a year. The hinges need some grease twice a year. Other hinges need some grease twice a year. Other maintenance is related to the direct environment of maintenance is related to the direct environment of the latrine: this includes cutting grass and repair of the latrine: this includes cutting grass and repair of erosion of mound on which latrine is built (in flooderosion of mound on which latrine is built (in floodprone areas). prone areas).

Cleaning walls of soak-away

Soak-aways receive liquids with a lot of dirt particles that will sink to the bottom of the soak-away pit or stick to the walls. This "sludge will reduce the infiltration capacity of the soak-away over time. Therefore, at the end of the dry season (low groundwater level) and after a longer period of non-use of the latrines (that is at the end of the holiday period), the walls of the soak-away must be cleaned with a broom. This must be done both above and below the water level. The sludge at the bottom can be removed with a scoop. This action is needed at least once every five years.

Regular emptying of the pits of double offset pour-flush system

Some 12 to 24 months (best 24 months) after the second pit has started to be in use, and definitely before the second pit is full, the first pit needs to be emptied. This emptying is best done at the end of the dry season, as we can then expect that the content is dry. Remove the concrete cover of the first pit by putting two poles through the lifting handles, and place is carefully aside so that it does not get damaged. Using a bucket or a scoop, the pit content can be removed from the pit. Be careful not to damage the walls of the pit and keep the burnt bricks placed in-between the concrete rings untouched. If these burnt bricks are broken or displaced, replace them by new ones. Remove as much humus from the walls and bottom as possible. Rake the bottom of the pit to increase the infiltration capacity again. Then carefully put the cover back in its position. If there is water in the pit and the humus is not dry, then there may still some pathogenic microorganisms present in the humus. Handle the humus then with The content can be used as fertiliser on the fields. It

is definitely free of disease-causing organisms and there is no health risk at all.

Maintenance schedules

A maintenance schedule including the emptying of pits, painting of doors and whitewashing of walls, and soak-away (for urinal) cleaning should be made. An example is given below for a tenyear period. In the table the dates that maintenance/ emptying were done can be entered. Such a maintenance sheet can be copied on a large manila paper sheet, made attractive with some nice illustrations indicating the specific activity (e.g. paint brush, a spade&bucket etc.) to be done.

The operational and preventive maintenance care is very important as it lengthens the durability of the building

Maintenance activity	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10
Flow shift to other pit (indicate date										
and pit no.) (for double offset pour-										
flush)				_						
Emptying of pit (indicate date and pit	-						T		1	
no.) (for double direct pit)										
Emptying of pit (indicate date)										
(single pit systems)										
Emptying of temporary pit (indicate							Г			
date) (single pit systems)										
Cleaning walls soak-away (date)										
Painting doors (date)										
Greasing hinges of doors										
Whitewashing indoors (date)										
other (date)										
other (date)										
other (date)										

Yearly conditional check and possibly repairs and/or replacement of latrine or pit parts Repairs and replacement may include the issues in the following list. These parts are to be checked yearly or repaired when needed.

YEARLY SCHOOL LATRINE/URINAL SYSTEM INSPECTION FORM

School: Inspection done by: Inspection date:

Year:

		Cond	lition	repair or replacement				
Latrine item	ОК	Fair	Needs repair/rep lacement	What done	When(date)	By whom	What cost	
Latrine slab								
Latrine pan								
Water seal (U-shape)								
Vent pipe from pit								
Screen on vent pipes								
Drainpipe latrine								
Drainpipe soak-away								
Concrete cover of pits								
Concrete cover of soak-away								
Door of latrine and hinges								
Plaster inside								
Plaster outside								
Paint urinal								
Masonry walls / CIS-walls and angle iron frame								
Roof and roofing material								
Locks of latrine								
Concrete steps to raised latrine								
	1							
						1		

* in case of mound latrine