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Architectural Norms and State of Place of the Latrines in the Schools of the Township of Likasi (DRC)

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Abstract: ***The school is pedagogically a place of training and meeting between the pupils, the teachers, the administrative and the other operators of the teaching. She/it must be organized according to the prescribed legal establishes by the legislation.On a hygienic level, she/it must be maintained, maintained and, to have the latrines of good quality and in number being sufficient to the size of the users. As they pass a big part of their day there. The different actors in a school are sometimes called on to make use of the sanitary facilities. While placing at their disposal of the hygienic latrines, as the association told it for the child's Health, in acronym THE afpssu, (2016), one instills the importance of health and hygiene in the hope that the pupils transmit these notions in their families and communities.***

Keywords: School, Architectural Norms, Latrines

1. Introduction

To be hygienic, the man must be educated to health to allow him to arrange his/her/its vital space while making it better, clean, hygienic and pleasant. Today, several relative norms to the school hygiene are disregarded nearly by the majority of the leaders and the administrators of the school establishments implanted in our middle. Indeed, the sanitary facilities are to the basis of the propagation of the various illnesses: the cholera, The typhoid fever, the bacillary dysentery, the amities, etc.

In the school environment, the observation of the hygienic conditions by the actors of the education is a good gait of different ways in the prevention of the illnesses. The education to health, the observation of the norms of conceptions and realizations of the sanitary facilities in the school surroundings of the township of Likasi proves to be indispensable.

Neufert, (1996, p. 258), affirm that" *the sanitary facilities must be as much that possible aired and directly illuminated; The number of the seats, urinals and sinks calculate itself according to the total number of the pupils, while separating the entries for the boys and the girls* ".

Also add that, the doors and the other openings of the sanitary facilities, must be placed of the westward East in order to receive the solar rays sufficiently, contrary to the wall gable of the class rooms to limit the odors and to eliminate the microbes while keeping them dry. In the case where they benefit from an artificial lighting, the latrines must be nourished while respecting the numbers of lucks that there are destined.

The report that we made in the schools is as not only facilities don't exist and where they exist the hygienic norms are not respected. What drives us to ask us the following question:

Do the sanitary facilities of the schools done implant in the township of Likasi respect - them the architectural norms as hygiene require it?

Of straightaway, the answer is negative.

Our objective is that the administrators of the establishments manage to construct the schools while holding account of the necessity and the importance of the latrines in number being sufficient and of quality, that is while respecting the norms required to maintain the pupils in good physical health in order to guarantee them a good blossoming. This education intends to give some tracks of solution of improvement and purification in order to fight against the illnesses that are at the origin of the different pains contracted by the schoolchildren in the township of Likasi.

To collect the data and to verify the hypothesis raised by the question of our survey, we resorted to the descriptive method supported by the techniques of observation and maintenance. Our sample is composed of some schools of the township of Likasi.

The survey is located in the domain of the school hygiene where we analyze the architectural norms of the latrines in the public and private secondary schools accept the township of Likasi during the school year 2016. 2017. She/it interests all partners of the sector of the teaching.

2. Conceptual and Theoretical Aspects1

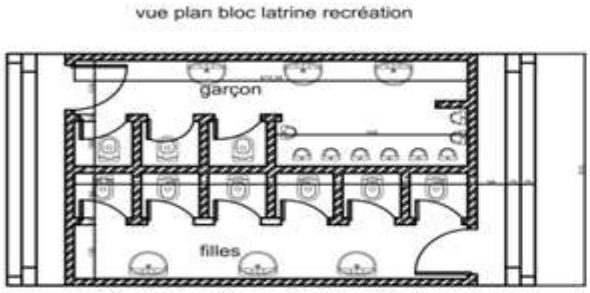
1) The School

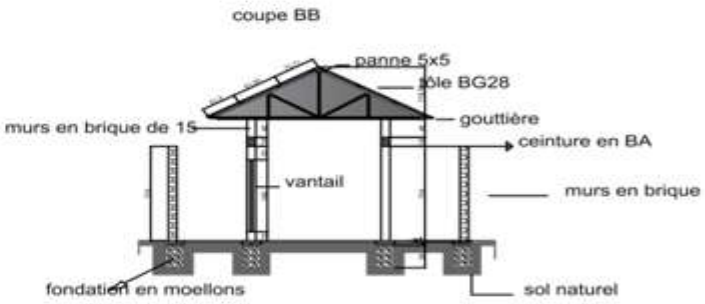
Francis Mulder and Pierre Van Hoyé, (2005, p.221), affirm that: "*The educator in school environment is brought to hold an essential role: to consider every child / teenage and adult (in the teaching of social promotion) in his/her/its oddness of topic and to help it to find a place in his/her/its school and social environment* ". The school is an establishment, in which one gives a collective teaching, Compilation texts hist., (1883, p206) affirms that: "*the school it is a general*

teaching establishment. Childish, laic, free, mixed school, school of the brothers, of the village. "

2) Architectural Notions

Architectural, of the term architecture, that is a passion, a vocation, a call. at the same time as a science and a commercial activity. One described it like a social art, but also as an artistic science. She/it must be the expression of the design to his/her/its best, and bring, according to the words of Marcus Vitruvius, big architect and Roman historian: "solidity, utility and beauty ". According to Neufert (op. cit. p. 258), for a block of about 100 boys about 15 m2, it is necessary: 2 WATER-CLOSETS, 6 Urinals, 2 Sinks; For 100 girls 100 girls about 15 m2, it is necessary: 4 WATER-CLOSETS, 2 Sinks; For a Block sanitary professor about 20 women about 10m2, it is necessary: 2 WATER-CLOSETS and 1 Sink; For a Block sanitary professor about 30 professors about 15m2, 2 WATER-CLOSETS, 3 Urinals and 1 Sink are necessary.





3) The School Hygiene

Hygiene in the school establishments is the set of the measures destined to protect health and the security in the school establishments. The measures of hygiene's are especially important that the school welcomes young children, population more exposed to the infectious risk, says the association for the child's health in his/her/its course of life in acronym" THE afpssu ".

For this association, in the schools: "A level raised of individual hygiene in school environment cannot be gotten that if the local of the pupils, and in particular the sanitary, are clean and in good state ".

4) Construction of the Latrines

Classification of the different types of the latrines according to EAWAG is (Institute of Switzerland research close to Zurich) the next one:

- **Among the dry latrines to buried pits**, we classify: the latrines to unique pit, latrines have double pit, the variants of these first two types of latrines (either stilted latrines, either drilled latrines) that are achieved in case of the hard soils, the latrines VIP (to improved ventilation)
- **For the dry latrines of types ecological has pits above soil**, we find **the ecological latrines to compost** that have for advantage measured it in part of the investment by the sale of compost and the retraining of the garbage. The inconvenience, that they require more care than a classic latrine.
- **The ECOSAN latrines to compost and separation of urine** that have for advantage the fact that they are more ecological, smelling in, valorize excreted them. As inconvenience, the manipulation is more numerous, the cost is raised and the solid manpower.
- **The latrines or toilets to water and to siphon** have for particularity the necessity of a water hunt, manual or mechanical. As advantage the best comfort, the almost-total elimination of the odors and the moderate investment Cost. As inconvenience: they require a lot of water and a regular draining or an adjusting in the sewer. The cost (order of size variable bus according to the country, materials and the elevated manpower cost).
- **The latrines or school or communal sanitary blocks** that have for particularity the collective equipment. As advantage: a collective hygiene and as inconvenience the very elevated maintenance cost in case of stopping.
- **The school latrines in the township of Likasi**; most latrines that we visited are latrines to water and to siphon, and the latrines to buried pit.

3. Methodological Aspects

Considering the Likasi commune as investigative fields, we took a school population to do our study. We say that the population refers to all individuals or groups of individuals under a scientific investigation. As part of our research, the population is made up of administrative staff, teachers, and workers in the schools of Likasi commune.

Table 1: Presentation of the study population in the different schools of the municipality of Likasi

No	School	Appurtenance	Localization	Population					
				Members of the Management Committee	Teachers and Administrators	students			number
						G	F	T	
1	C.S. STE THERESE	CATHOLIQUE	C / LIKASI	3	18	134	218	352	373
2	C.S MYAMBA	PRIVE	C / LIKASI	3	27	200	405	605	635
3	INST. TECH. SNCC/LIKASI	SNCC	C / LIKASI	5	43	998	86	1084	1132
4	INST. KALUNGA	PRIVE	C / LIKASI	4	40	220	380	600	644
5	C.S. TECHNIQUE NYELE	PRIVE	C / LIKASI	3	31	490	104	594	629
6	C.S LES ELITES II	PRIVE	C / LIKASI	3	89	900	934	1834	1926
7	C.S. LES MOINEAUX	PRIVE	C / LIKASI	3	39	490	361	851	893
	TOTAL			**31**	**391**	**5818**	**3505**	**9323**	**9746**

Source: Data collected in the city of Likas

Comment: The data in this table show that of the seven schools in our sample, we have: 31 members of the Management Committee, 391 Teachers and Administrators, 5818 students.

1) Sample

As part of our research, we took as sample: the administrative, the teachers and the workers. Here are the different data based on the few targeted schools in the municipality of Likasi:

Table 2: Presentation of the sample according to the subjects in the different schools

No	School	Appurtenance	Localization	Members of the Management Committee	Teachers and Administrators	Number
1	C.S. STE THERESE	CATHOLIQUE	C / LIKASI	3	18	21
2	C.S MYAMBA	PRIVE	C / LIKASI	3	27	30
3	INST. TECH. SNCC/LIKASI	SNCC	C / LIKASI	5	43	48
4	INST. KALUNGA	PRIVE	C / LIKASI	4	40	44
5	C.S. TECHNIQUE NYELE	PRIVE	C / LIKASI	3	31	34
6	C.S LES ELITES II	PRIVE	C / LIKASI	3	89	92
7	C.S. LES MOINEAUX	PRIVE	C / LIKASI	3	39	42
	TOTAL			**31**	**391**	**422**

Source: Data collected in the city of Likasi

Comment: The data in this table shows that of the seven schools in our sample, we have: 31 members of the Management Committee and 391 Teachers and Administrators, giving us a total of 422 samples

2) Method and Techniques

As part of our study, we used the descriptive method and allowed us to describe quantitatively the features, the characteristic elements of latrines in the schools of Likasi community, and to determine the relationship that must exist between number of latrines and students.

- **The observation allowed** us to study and monitor carefully the sanitary facilities located in the different schools in the municipality of Likasi to verify the construction standards in this area.
- **The interview allowed** us to get in touch with the administrative staff, teachers and workers in order to have information related to the construction of toilets, the types of latrines as well as the number of toilets in their respective report.

3) Search Results

We presented the data in the double-entry table to facilitate their analysis and interpretation. These data are collected from seven schools on the whole that are found in the municipality of Likasi, and are analyzed according to the realities of each school and given in the tables below:

Table 3: Presentation and analysis of the results to C.S. Sainte Therese

No	School	Number	Latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	%
1	C.S. STE THERESE										
	Male students	134	3	4	100,0	6	4	66,6	2	0	0,0
	Girls students	218	5	5	100,0	–	–	–	2	0	0,0
	Teachers-Men	19	2	1	50,0	3	0	0,0	1	0	0,0
	Teachers- Woman	2	0	0	0,0	–	–	–	1	0	0,0

Source: data collected at C.S. St. Therese

Comments: The data in this table shows that there are 134 male students for 4 latrines, 4 urinals, 0 washbasins; 218 girls for 5 latrines and 0 washbasins; 19 Administrators and Teachers Men for 1 latrine, 0 urinal, 0 washbasin; 2 Administrative and Teaching Woman for 0 latrine, 0 washbasin

Table 4: Presentation and analysis of results with C.S. Myamba

No	School	Number	latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	**%**
2	C.S MYAMBA										
	Male students	200	4	1	25,0	10	0	0,0	4	0	0,0
	Girls students	405	16	1	6,3	–	–	–	6	0	0,0
	Teachers-Men	26	2	0	0,0	3	0	0,0	1	0	0,0
	Teachers- Woman	5	2	0	0,0	–	–	–	1	0	0,0

Source: Data collected at C.S. Myamba

Comment: The data in this table shows that there are 200 male pupils for 1 latrine, 0 urinal, 0 washbasin; 405 girls for 1 latrine and 0 washbasins; 26 Administrators and Teachers Men for 1 latrine, 0 urinal, 0 washbasin; 5 Administrators and Teachers Women for 0 latrine, 0 washbasin.

Table 5: Presentation and analysis of results at the Technical Institute of the National Railway Company of Congo in abbreviation: "SNCC" / Likasi

No	School	Number	latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	%
3	INST. TECH. SNCC/LIKASI										
	Male students	998	10	7	70,0	36	5	13,8	12	1	8,3
	Girls students	86	2	2	100,0	–	–	–	2	1	50,0
	Teachers-Men	16	1	1	100,0	3	3	100,0	1	0	0,0
	Teachers- Woman	5	1	1	100,0	–	–	–	1	0	0,0

Source: Data collected at the SNCC / Likasi technical institute

Comment: The data in this table shows that there are 998 male students for 7 latrines, 5 urinals, 1 sink; 86 female students for 2 latrines and 1 washbasin; 16 Administrators and Teachers Men for 1 latrine, 3 urinals, 0 washbasin; 5 Administrative and Female Teacher for 1 latrine, 0 washbasin

Table 6: Presentation and analysis of results at the Kalunga Institute

No	School	number	latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	%
4	INST. KALUNGA										
	Male students	220	3	1	33,3	14	2	14,29	5	0	0,0
	Girls students	380	15	1	6,7	–	–	–	8	0	0,0
	Teachers-Men	42	1	1	100,0	3	0	0	1	0	0,0
	Teachers- Woman	5	1	0	0,0	–	–	–	1	0	0,0

Source: Data collected at the Kalunga Institute.

Comment: The data in this table shows that there are 220 male pupils for 1 latrine, 2 urinals, 0 washbasins; 380 girls for 1 latrine and 0 washbasins; 42Administrative and Teachers Men for 1 latrine, 0 urinal, 0 washbasin; 5 Administrative and Female Teacher for 0 latrine, 0 washbasin.

Table 7: Presentation and analysis of results at C.S. Technique Nyele

No	School	Number	Latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	%
5	C.S. TECHNIQUE NYELE										
	Male students	490	11	2	18,2	18	0	0,0	6	0	0,0
	Girls students	104	4	2	50,0	–	–	–	2	0	0,0
	Teachers-Men	43	2	1	50,0	5	0	0,0	1	0	0,0
	Teachers- Woman	1	1	1	100,0	–	–	–	1	0	0,0

Source: Data collected at C.S. Technique Nyele

Comment: The data in this table shows that there are 490 male students for 2 latrines, 0 urinals, 0 washbasins; 104 girls for 2 latrines and 0 washbasins; 43 Administrators and Teachers Men for 1 latrine, 0 urinals, 0 washbasin; 1 Administrative and Female Teacher for 1 latrine, 0 washbasin.

Table 8: Presentation and analysis of results in C.S. Elites II

No	school	Number	Latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	Number	%
6	C.S LES ELITES II										
	Male students	900	18	10	55,6	54	15	27,8	18	2	11,1
	Girls students	934	38	10	26,3	–	–	–	19	2	10,5
	Teachers-Men	64	4	6	100,0	7	4	57,1	2	0	0,0
	Teachers- Woman	22	2	2	100,0	–	–	–	2	0	0,0

Source: Data collected at C.S. Elites II.

Comment: The data in this table shows that there are 900 male pupils for 10 latrines, 15 urinals, 2 washbasins; 934 girls for 6 latrines and 2 washbasins; 64 Administrators and Teachers Men for 6 latrines, 4urinoirs, 0 washbasin; 22 Administrators and Teachers Women for 2 latrine, 0 washbasin.

Table 9: Presentation and analysis of results at C.S. Sparrows

No	school	Number	latrines			Renoirs			Lavabos		
			Number recommended	Number	%	Number recommended	Number	%	Number recommended	N Number	%
7	C.S. LES MOINEAUX										
	Male students	361	8	3	37,5	13	7	53,8	5	0	0,0
	Girls students	490	23	5	21,7	–	–	–	6	0	0,0
	Teachers-Men	28	2	3	100,0	3	3	100,0	1	0	0,0
	Teachers- Woman	14	2	2	100,0	–	–	–	1	0	0,0

Source: Data collected at C.S. Sparrows.

Comment: The data in this table shows that there are 361 male students for 3 latrines, 7 urinals, 0 washbasins; 490 female students for 5 latrines and 0 washbasins; 28 Administrators and Teachers Men for 3 latrines, 3 urinals, 0 washbasins; 14 Administrative and Teaching Woman for 2 latrines, 0 washbasin.

4. Discussion of the Results

The results presented after the field trip in each of the schools, show that each school is a case and shows flaws on standards as Neufert (op cit) says.

The study being carried out on three large elements, referring to Neufert (258): WC; Urinals and sinks, there are some small items that accompany these first three: sanitary napkins, disinfectants, soaps, etc. All this aims to provide a good schooling and hygiene education that reduces disease.

The other very important point is that of the positioning of the openings of the blocks by contribution to the direction of the sun; most sampled latrines do not respect this aspect. The results found are the ratio of toilet numbers and the actual number of pupils in the different schools in Likasi commune. The results show that many schools in our field of investigation do not respect the conditions of latrine construction and maintenance as well as the number of toilets in relation to the number of students. This does not allow students to study in hygienic standards.

With regard to the standards of construction and architectural of the toilets, if we proposed the model in the recommendations it is because the conditions of constructions are not fulfilled. This model allows positioning a hand washing, a Turkish toilet or tank, urinals. Dimensions and numbers of materials should be based on the number of students and teachers, and the management committee. The pupil numbers in most of the target schools are above the latrine capacity and require resizing. During the planning, modalities of use of the blocks will have to be decided, and this in a concerted manner with the categories of users.

Jérémie Toubkiss, Urba Consulting, (2012, P14) in the Concerted Municipal Strategies (CMC), affirm that: "even before the construction, to define the rules of use, three questions will be able to feed the reflection and the exchanges:

- Will one or more latrines be reserved for management staff?
- Does a specific latrine say it is assigned to a given class?
- Does each specific latrine claim to be assigned to a particular age group? "

These authors respond in these terms: "*It should be noted that some sanitary blocks are overuse damaging to their good maintenance*,"

This is the case for the latrines encountered on the spot, because there are cells that were difficult to access during the descent on the ground, because of the overpopulation, even the maintenance work is difficult to maintain. Especially since the interview agents are few.

Knowing the number of students per class, this would allow us to evaluate how many latrines we will allocate to each class or age group. Referring to data from Canada, for example, and specifically to Quebec, data from August 27, 2009, by MARIE Allard and FRANCIS Valles, the press, from the Ministry of Education, the number is 32 to 36 high per class at secondary. In the Democratic Republic of Congo, the maximum size varies from 50 to 55 pupils per class according to the World Bank online document, on the African region, P110, T4.18.

As for their maintenance standards, the toilets being insufficient in most of our targeted schools, the maintenance work is difficult to manage. Referring much more to the construction standards given by Neufert (op.cit P258), the latter is contradicted by the publication of Jeremiah Toubkiss, Urba Consulting, (op.cit P14) which states that the estimation of a latrine for 30 to 60 students does not encourage the proper maintenance of the blocks. By interpretation, the author wants the numbers of pupils to be further reduced in order to keep the latrines clean.

In order for the establishments to maintain the existing sanitary blocks already, they have to resize them so that the latrines, urinals and washbasins remain clean, guaranteeing good conditions of use and hygiene. and security for users as it says in CMC, different tasks are to be accomplished:

Assign a sufficient number of staff capable of:

- Regularly check the operating status of each element of the toilet block;
- Check daily for the availability of maintenance and hand washing equipment;
- Clean sanitary blocks and the hand-washing device once or twice a day: sweep the floor, wash the floor and latrine slabs with soapy water if they are made of cement, clean the wall, etc. ;
- Perform light repairs such as changing faucets, consolidating a faulty latch, etc.

For the types of latrines, since the latter to be carried out depend on the type of use, the observation that was made

after descent on land, is only to schools that do not respect the types of latrines for school use. The school or schools tried to respect the types of construction, the constituent elements of the blocks are not respected. In addition the orientation, with respect to the direction of the solar rays, is not taken into account.

For this case, Neufert offers us four types:

- **WC classes** which are blocks with vestibule, not separated for boys and girls and which are placed next to a class, usable during school time and much more intended for kindergartens
- **WC sanitary** blocks that are separated between boys and girls, access by corridor or hall and usable by several classes during the hour from each room without WC and must be accessible after 40 m maximum or a staircase.
- **WC recreates**: sanitary block which is separated for boys and girls access by yard or yard and usable during recreation accessible by the recreation areas.
- **WC teacher**: separate sanitary block between man and woman, access to teachers or administrative staff during the recreation whose vendible is in relation to the cloakroom of teachers.

Let's also add that the respect of these classifications must be accompanied by the orientation of the blocks in accordance with the direction of the sun, so from East to West so that these blocks benefit from a natural recycling.

5. Conclusion

Since the world of research is so vast, our contribution focuses on the recall of latrine standards in schools according to Neufert and in particular in the commune of LIKASI and generally throughout the city of Likasi. **We put a particular emphasis on the positioning of doors and openings to the different blocks that constitute them**.
The different results found prove that ignorance about the need for latrines meeting the standards remains manifest in the man or woman who is trainers and educators of future managers. As defecation is a human need imperatively, education on the use of latrines in the school environment is essential, for a good schooling so that each trained individual is a message carrier by all or he will be after his training and will make good use of it.

This information does not only concern schools targeted. They concern both nursery schools, primary and secondary. Having noted the lack of water in schools, especially that REGIDEZO feeds some of them periodically, if the Congolese State, with these partners can think of drilling wells in schools so that there is regular water, because without water, it is difficult to keep the sanitary facilities clean. We propose in annex a model of latrines (Blocks recreation) respecting the direction of the sun and whose openings are placed from East to West.

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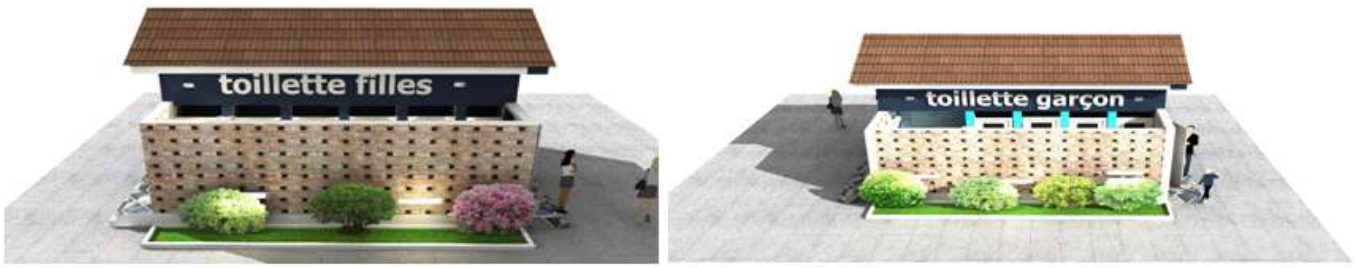
Comment: This model is intended for 150 students on the boys side and 150 students on the girls side with a sun orientation from east to west,



Annex 1

OUEST **EAST**

Front view / rear view

Annex 2
Right and left view