

SURVEY AND ASSESSMENT OF THE MANAGEMENT AND TREATMENT STATUS OF FECAL SLUDGE IN THAI NGUYEN CITY

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SUMMARY

According to Decree No. 42/2009/ND-CP Thai Nguyen City is urban type II, the speed of urbanization in Thai Nguyen is growing rapidly along with the increase in population, which led to the advent of mass septic tanks in the household toilets or toilets of agencies, schools, service centers... and a large amount of sludge from septic tanks is generated annually, but the management of type this waste in Thai Nguyen City isn't good and the city also do not have planning about the treatment area as well as treatment measure for fecal sludge. Only a small amount of fecal sludge is collected and landfill with municipal solid waste in Tan Cuong solid waste treatment area. A large amount of fecal sludge is dumped arbitrarily. This is causing serious environmental pollution. This paper sets out the survey and initial assessment of the current status of fecal sludge management and treatment in Thai Nguyen City as a basis for further researches and the basis for managers, professionals launch fecal sludge management and treatment measure which suitable with Thai Nguyen city.

Keyword: *sludge, fecal sludge, septic tank, fecal sludge management, fecal sludge treatment*

OPENNING

Nowaday, In Viet Nam general and Thai Nguyen city, along with economic development is rapid population growth, particularly in urban areas. According to the Ministry of Construction urban population will account about 45% in 2020 [3]. The rapid development of the urban population has led to the generation of large amounts of fecal sludge, while collection and treatment is not done thoroughly and have been causing environment pollution problems seriously. Fecal sludge is a form of sludge, arised from septic tank. When septic tank receives excretion products of human then the natural sedimentation takes place. And the wastewater is discharged into the public sewer system or into canals, rivers. The organic residue is metabolized in the bottom of the septic tank through the process of anaerobic digestion and fecal sludge formed [1,2,4]. According some recent reports, the most cities of Viet Nam have about 50% - 80% septic tanks and 15% - 30% single or double latrines [3]. In the future, septic tanks

will increase quickly. So management and treatment of fecal sludge are a great challenge to managers.

Thai Nguyen city is one of the urbans where fecal sludge management and treatment are having many shortcomings [5]. Therefore, the urgent issues are need to survey and assess the management and treatment of fecal sludge in Thai Nguyen city as the basic to give appropriate measure.

METHODS AND CONTENTS OF THE STUDY

Methods of the study

Actual survey: questionnaires and surveys in 100 households who using septic tank
Synthesizing data

Contents of the study

Form questionnaires; Survey in households (100 households) and the competent agencies in fecal sludge manage and treat: Thai Nguyen Department of Construction, Thai Nguyen Department of Natural Resources and Environment, Thai Nguyen Urban Environment Corporation (URENCO Thai Nguyen), Thai Nguyen Water Supply and Sewerage Company.

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Assessing the effectiveness of fecal sludge managing and the treatment technologies that is existing in Thai Nguyen city.

RESULTS AND DISCUSSION

The operation status of septic tanks

The survey and investigation obtained some results:

Among households asked, having 71,3% septic tanks are connected to the sewer system, 28,7% septic tank to be disposal freely to the garden or land surrounding of households.

Septic tanks which have time use than 5 years are 66.7%, from 3 to 5 years are 16.1%, from 1 to 3 years are 9.7%, less than 1 year are 3.3% and 4.2% unknown time.

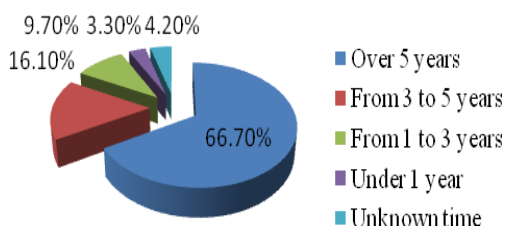


Figure 1. Graph of time using septic tank in households

Number of emptying septic tanks of households: 75.3% of septic tanks never emptied, 17.4% of them emptied once, 7.3% of them emptied two times and no any septic tank emptied over two times.

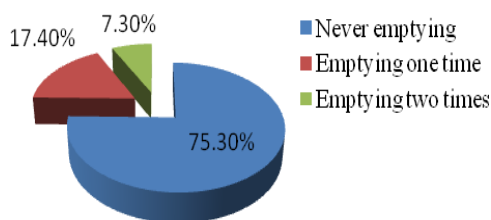


Figure 2. Graph % of time septic tank emptied in households

Reason for emptying septic tanks at households: due to repair home is 43.9%, due to stink is 54.6% and another cause is 1.5%. The survey results show that awareness of environmental sanitation of the community is

very weak. People have not seen the necessity of the emptying septic tank periodical. The emptying is spontaneous and depends on the needs of households completely. Only when septic tanks in households are clogged, stunk or when households repair home then septic tanks are exhausted. And the number of times emptying is also very little, no any household exhausted their septic tank more than 2 times. The majority of households (75.3%) have never exhausted their septic tank although the period of use of these tanks is relatively longer, majority over 5 years (66.7%). Besides, a large number of septic tanks are connected to the general water drainage system which impact significantly on the performance of urban drainage systems. Fecal sludge can go to the pipe of the sewer system and cause blockage. So the sewer is blocked and stunk regularly. Every time it rains, many roads in the city have flooded obstructing traffic on road.

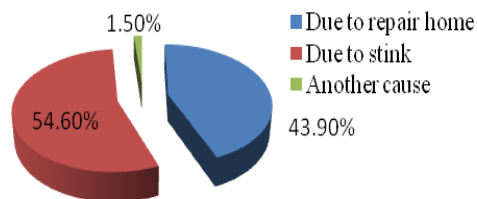


Figure 3. Graph % of the causes septic tanks are emptied

The management and treatment status of fecal sludge

The survey showed that the emptying service sludge from sewage treatment plants and septic tanks is done by Thai Nguyen URENCO under the control of Thai Nguyen Urban Public Service Management Board. However, a large of fecal sludge are emptied, transported and disposed by privately.

The management, maintenance and dredging of the city's drainage system are done by Thai Nguyen Drainage and Urban Infrastructure Limited Company under the control of the Provincial People's Committee.

According to the figures of Thai Nguyen URENCO, the status of the fecal sludge management in Thai Nguyen city following:

- Means of dredging/collecting, storing: car suck waste.
- Transportation: 1 car suck waste 2.7m^3 , averaging 1.5 trips / day and shipping cost is 90781dong/ m^3 .
- The number of workers in charge of collecting, transporting: 2 people.
- Position of dump fecal sludge: Tan Cuong Waste Landfill, about 20km from city center
- Treatment: sanitary landfill
- Cost of disposal and treatment: 60460 dong/ton sludge.
- The amount of fecal sludge collected annually: 1500 m^3 / year.

These figures show that service of emptying and collecting fecal sludge is very arbitrarily, no annual plan. Fecal sludge is collected with very small amount. Thai Nguyen URENCO is only collecting about 4m^3 /day. Meanwhile, a large number of fecal sludge is collected by private companies uncontrollably.

Technology emptying, collecting and transporting fecal sludge do not guarantee the environmental hygiene and the surrounding landscape. Means of these activities are old and not suitable to the poor infrastructure.

At present, the city has no planning place to dump and treat fecal sludge. The sludge after collecting is not thoroughly treated. Only a small amount of the sludge collected by URENCO is landed with municipal waste solid in Tan Cuong solid waste treatment area. A large amount of the sludge collected by privates is not managed and not knowing where dump. This does not only cause pollution but also is a threat to public health.

Capacity of waste management remains limited, due to:

- Lack of finance,
- Technology and human resources do not meet the urgent need for environmental protection yet.

- State budget for fecal sludge management and treatment is limited.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Nowadays, emptying the septic tanks in Thai Nguyen city is entirely spontaneous. It depends on the households. Most of the families are not aware of the importance of emptying the septic tanks periodically. They are only empty the septic tank when they repair the house or when the tank has problems such as: block, stink impacting to daily activities directly.

The fecal sludge management is loose and the city also has not a place to treat this waste. A large amount of this sludge is collected by private. And, nobody knows how much of this amount, how is treated? Primarily this amount is dump into rivers and streams, fish ponds, canals indiscriminately or sold to farmers. Only the small amount of this waste collected by Thai Nguyen URENCO but was buried in landfill with municipal solid waste. In the future, the more growing urban, the more increasing population, if this situation is not be remedied it will cause environmental pollution and arising serious diseases.

Recommendations

In collecting fecal sludge

Thai Nguyen city should strengthen the collection more efficient. Overall, the collection and emptying are determined by the needs of the household but in some cases can not wait to households in needs of emptying. Especially, when environment is polluted by the emptying septic tanks is not frequent. For example, septic tanks have not ability in biodegradation when they have too much accumulation sludge lead to the overload of pollutants in groundwater, drains and surface waters.

Need to strengthen the capacity of companies who supply fecal sludge emptying service. They must have the database about sanitations

and emptying time. Besides, they also must have good planning capacity and the appropriate technical equipment.

Need to help households get an understanding and awareness about importance of emptying their toilet more often. If necessary, the city can consider a different fee system to encourage households emptying their septic tank often.

Must ensure sludge is transported to places designated. Avoid unknowing where dump fecal sludge of private services as now.

A problem which is occurring nowadays is difficulty when fecal sludge trucks approach sanitation facilities to collect sludge. Currently, Thai Nguyen URENCO has only one the truck therefore the city needs to buy more the trucks which have improved suction pump system. Besides, the trucks also need maintenance periodically.

Need to ensure stable financing for the management of fecal sludge. The fecal sludge management can be only successful when the financial viability is assured. At least, operating costs need to be ensured from turnover or service charges. Need to reduce its dependence on subsidies from outside sources.

In treating fecal sludge

The city should plan a reliable place to treat fecal sludge. And this area will not cause environmental problems and public health. Besides, it has to makes the area attractive enough to all sludge collected is given to there. This location must have the appropriate location to avoid high transportation costs. When choose the place, need to consider the attitude agree or disagree of residents living near or on the way to this place. Need to held

talks on the issue of compensation in the early stages of the planning. Need to consider ability of extending the factory and green belt when choosing the site for the processing.

Managers should collaborate with experts to choose the appropriate processing solution so that the products of the processing are odorless and hygienic. The smell is usually a problem which surrounding population feels difficult to accept than the risks to health and the environment. We can reduce odor by selecting the most appropriate treatment technology or treatment place have the appropriate distance with residential areas.

Sludge reuse in agriculture need to be transferred to farmers with a form that can acceptable. Need to ensure products meet the requirements of consumers. The most convenient is to place the treatment plant near the reuse area to reduce transport costs but still near the collecting area.

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TÓM TẮT
KHẢO SÁT, ĐÁNH GIÁ HIỆN TRẠNG QUẢN LÝ VÀ XỬ LÝ PHÂN Bùn BỂ TỰ HOẠI TẠI THÀNH PHỐ THÁI NGUYÊN

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Theo nghị định số 42/2009/NĐCP thành phố Thái Nguyên thuộc đô thị loại hai, tốc độ đô thị hóa tại thành phố đang phát triển mạnh kèm theo đó là sự gia tăng dân số, điều này dẫn đến sự ra đời hàng loạt bể tự hoại tại các nhà vệ sinh hộ gia đình hoặc nhà vệ sinh cơ quan, trường học, trung tâm dịch vụ... Và một lượng lớn chất thải phân bùn bể tự hoại phát sinh hàng năm, tuy nhiên việc quản lý loại chất thải này tại thành phố Thái Nguyên còn nhiều bất cập và thành phố cũng chưa có quy hoạch về khu xử lý cũng như biện pháp xử lý chất thải này. Chỉ một lượng nhỏ phân bùn bể tự hoại thu gom được chôn lấp cùng chất thải rắn sinh hoạt tại khu xử lý chất thải rắn Tân Cương của thành phố còn lại một lượng lớn phân bùn được đổ thải tùy tiện gây ô nhiễm môi trường nặng nề. Bài báo này đưa ra những khảo sát, đánh giá ban đầu về hiện trạng quản lý và xử lý phân bùn tại thành phố Thái Nguyên làm cơ sở cho những nghiên cứu tiếp theo và cơ sở để các nhà quản lý, chuyên gia đưa ra biện pháp quản lý và xử lý phân bùn bể tự hoại phù hợp cho thành phố Thái Nguyên.

Từ khóa: *phân bùn, phân bùn bể tự hoại, bể tự hoại, quản lý phân bùn, xử lý phân bùn*

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