

Planning cemetery parks and cremation establishments in the major cities of Vietnam

Han Minh Cuong¹ Bach Ngoc Tung², Saito Takahiro³, Le Duc Tri⁴

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Abstract: Within the scope of this paper, the group of authors studied and presented the general process of the formation of urban cemetery development, especially cemetery parks using modern cremation technologies, after studying the model of Japan (99,9% of the world's highest cremation rates) as well as the directions, guidelines and preferential policies of the Vietnamese Government on cemetery parks. From these bases, the authors proposed a number of measures to promote investment in the construction of cremation cemeteries and establishments in major cities in Vietnam in general and for the capital Hanoi and some neighboring provinces in particular, to meet the demand of the population, to effectively use land funds, and to protect the environment.

1. Introduction

Due to its concentrated population, cemeteries are a necessary and long-standing feature of the social infrastructure of Vietnam. It is therefore necessary that proposals aimed at improving the living standards of the population, and those that address cemetery construction planning, be simultaneously considered and implemented.

At present, burial is popular in Vietnam. There are 101,064 hectares of cemetery land, accounting for 0.3% of the total national area (an increase of 4,013 hectares compared to the 2005 annual report). Particularly, Ho Chi Minh City has 951 hectares of cemetery land, and Hanoi has 2,893 hectares of cemetery land. Thua Thien Hue province has the largest percentage of cemetery land in the country in relation to its residential area: the residential area of the province is 18,235.27 hectares, accounting for 1.87% of the natural area, and the cemetery land area is 9,448.51 hectares, equivalent to roughly 50% of the residential area.

On the other hand, according to GSO data, the crude death rate of Vietnam is around 6.8 deaths per 1,000 population. This equates to 620,000 deaths per year in the current population of around 92 million. If each person needs an average of 4m² for burial, the country's demand will be more than 240 hectares of cemetery land each year, in what is mainly agricultural land. This will result in a wastage of land resources and environmental pollution due to waste water, and so on.

To address this problem, the government of Vietnam issued Decision 2282/QD-TTg,

thereby approving the scheme to develop the practice of cremation with a step-by-step popularisation of cremation for Vietnamese citizens in all localities across the country, with the aim of achieving civilisation, modernity, land saving and environmental protection.

Nowadays, the demand for cremation in major cities, especially, the area is located in the capital Hanoi (the capital area includes the entire boundary of Hanoi Capital and the surrounding provinces: Vinh Phuc, Bac Giang, Bac Ninh, Hai Duong, Hung Yen, Ha Nam, Hoa Binh, Phu Tho, and Thai Nguyen, the total area is about 24,314.7 km²) is increasing and in recent years (current rate is 65%). Cemetery parks are gradually being constructed and put into operation to replace the traditional graveyards, which are overloaded, degraded and polluted. This is a new model and development direction that is attracting the attention and investment of domestic and foreign enterprises. These garden cemeteries have a pure, sacred, clean, beautiful and friendly environment that will gradually change the concept of traditional cemeteries. Cemetery parks have been established in many areas, including Vinh Hang Cemetery (Hanoi), Lac Hong Vien Cemetery (Hoa Binh), Thien Duc Cemetery (Phu Tho), and An Vien Vinh Hang Garden Cemetery (Dong Nai). However, investment in the construction of cremation establishments in these major cities is still facing difficulties. Therefore, this paper will propose a model of cemetery parks with recommendations to promote investment in the development of cremation establishments in major cities in Vietnam in general and for the capital Hanoi and some neighboring provinces in particular, to meet the demand of the population's demand, to efficiently utilise the land fund, and to protect the environment.

2. Current status, cemetery planning, management of cremation establishments in Vietnam and Japan

2.1. Current status, cemetery planning, management of cremation establishments in some major urban areas in Vietnam

2.1.1. Current status of changes in cemetery land in Vietnam

From 2000 until now, Vietnam has executed four Land comprehensive surveys (in 2000, 2005, 2010 and 2015). Based on statistics compiled from these surveys, changes in current cemetery land use structure can be analyzed and investigated for general understanding in order to provide recommendations for improving effectiveness of land use in the country.

Table 1: Current status of non-agricultural land use in Vietnam through surveys

Items	Area (ha)				Changes in area (ha) Increase (+), decrease (-).			
	2000	2005	2010	2015	2000-2005	2005-2010	2000-2010	2000-2015
Total area	2,850,298	3,232,715	3,670,186	3,697,829	+382,417	+ 437,471	+819,888	+847,531
Residential land	443,178	598,428	680,477	698,611	+155,250	+ 82,049	+237,299	+255,433
Specialized land	1,072,202	1,383,766	1,794,479	1,839,161	+311,564	+ 410,713	+722,277	+766,959
Land for religious & belief purposes		12,804	14,620	1,834,200		+1,816		+1,834
Cemetery & grave land	93,741	97,052	100,939	103,578	+3,311	+3,887	+7,198	+9,837
Land for rivers, streams & specialized surface water	1,143,087	1,137,445	1,075,736	986,969	-5,642	-61,709	-67,351	-156,118
Other non-agricultural land		3,221	3,936	51,169	+3,221	+715	+3,936	+51,169

Source: Land comprehensive surveys in 2000, 2005, 2010 and 2015

It can be seen in the above table that during the period from 2000 to 2010, there was a comparatively rapid growth in areas of cemetery & grave land at a rate of 8%/year, increasing from 93,700 ha (2000) to 101,000 ha (2010) and continuing to increase to 104,000 ha in 2015, accounting for 3.2% of the total non-agricultural land structure. Unauthorized building of graves located scattering through cultivated land without following land use planning is a common problem, which has badly affected agricultural production and environmental sanitation. Therefore, planning and standardizing the use of cemetery land has now emerged as an urgent issue in all regions and required solutions in the coming time.

2.1.2. Current status and cemetery planning

a. In Hanoi

In Hanoi, there are approximately 2,362 cemeteries (at national, city, district, commune and hamlet levels) with a cemetery land area of about 2,743 ha (accounting for 0.82% of natural land area), in which:

- + One National Cemetery: Mai Dịch Cemetery (Cau Giay District), with an area of about 5.5 ha.
- + Five city’s concentrated cemeteries (Yen Ky, Vinh Hang, Thanh Tuoc, Van Dien and Sai Dong Cemeteries) with a total area of 101.3ha (not including Nhon and Ngoc Hoi Martyrs’ Cemeteries).
- + Three district’s concentrated cemeteries (Son Tay Town People’s Cemetery, Ha Dong and Xuan Dinh Cemeteries) with a total area of 12.15ha.
- + Commune and hamlet cemeteries: 2,353 cemeteries with a total area of 2,624ha

At present, Hanoi is deploying investment in new construction and expansion of a number of cemeteries in order to fulfill its people’s burial needs. Investment in building cemeteries and cremation establishments is currently facing many difficulties; however, regeneration, upgrade and investment in new construction are still being deployed in order to protect the environment, restrict uncontrollable land use, and especially satisfy growing urbanization of Hanoi.

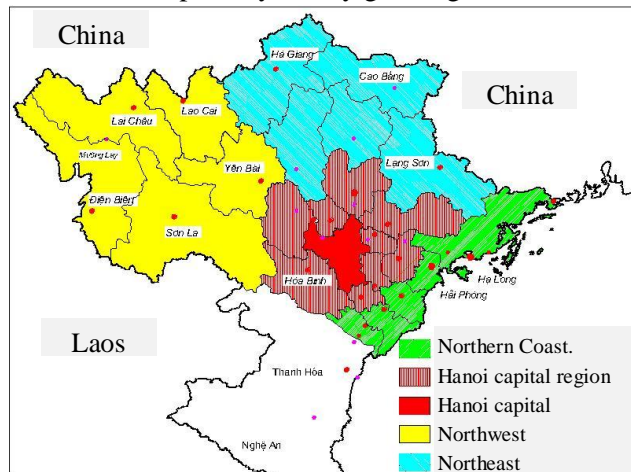


Figure 1: Hanoi Capital Region

b. In neighboring provinces of Hanoi Capital

- **Bac Ninh:** due to no cemetery planning available, at present, People’s Committee of Bac Ninh Province is attracting investment projects on cemetery construction in accordance with the content of approved general planning. Pursuant to Decision No. 1560/QĐ-TTg issued on Sep 10, 2015 on approval of Bac Ninh’s General urban planning project to 2030 with vision to 2050, it is specified that the demand for cemetery construction until 2030 is about 100ha. Including to

build four medium-sized cemeteries in the form of cemetery parks attaching to each urban area of Bac Ninh, Tu Son, and Tien Du; planning the cemetery using electric cremation.

- **Hai Duong:** Hai Duong has not yet have provincial cemetery management planning; statistics up to 2015 states that cemetery land area in Hai Duong Province is 1,656 ha. At present, there is only one city cemetery with an area of 8 ha in Hai Duong City, with a projected expansion area of 24ha, where the investor already built a cremation establishment to serve the people's need.

- **Hoa Binh Province:** the area of land for cemeteries in Hoa Binh Province is about 4,609 ha, in which there is one cemetery park, Lac Hong Vien, with an area of 189ha invested by QAGgroup. The province is now planning to attract investment in the cemetery project in Yen Mong commune, Hoa Binh city with the area of 85 ha.

- **Vinh Phuc:** The area of cemetery land in Vinh Phuc Province is 1,238ha according to statistics up to 2015. Because of increasing demand and in order for good management in burial activities, local government prepared and approved the construction and management plan of cemetery land in Vinh Phuc province as in Decision No. 29/2007/QĐ-UBND dated June 19, 2007. According to the approved general planning to 2030, Vinh Phuc Province requires investment in two additional cemeteries, Tam Dao District and Binh Xuyen District cemeteries, with the area of about 100ha in the form of cemetery parks.

- **Bac Giang District:** The area of cemetery land according to statistics up to 2015 is 3,850ha. At present, Bac Giang Province is in the process of attracting investment projects in order to socialize investment in cemetery construction. The cemetery in Yen Trung commune has a newly planning area of about 60 ha. Currently, the province is attracting investment projects on the construction of a cemetery in Lục Nam district with an area of 100ha (in the form of a cemetery park, performing different burial procedures such as first burial, final inhumation, cremation, etc.)

c. General comments

The proportion of land used for burial purposes in urban people's cemeteries is currently quite high, reaching 60-90% of total cemetery land area. The area for internal traffic currently often takes up 9.35-20.07% and the area for trees accounts for 0-16%.

Regarding current burial practice in cities, two burial procedures are mainly used, which are burial (inhumation) and cremation (widely used by residents in urban regions nowadays). However, as burial remains a long-lasting practice inherent from ancestors which has been deeply ingrained in Vietnamese people's thinking until now and is likely to last to a certain time in the future, burying urns containing ashes after cremation is still in practice, resulting in a high demand for land use for burial (inhumation).

At present, cremation is mostly performed in major densely-populated urban regions with no capacity to supply land for burial cemeteries, hence residents choose cremation to use land resource more effectively.

Local governments have been concentrating on management and planning of cemeteries in their provinces, at the same time promoting and encouraging residents to adopt using cremation with fee supporting policies.

2.1.3. Current status of cremation establishments

Rapid urbanization and population growth, together with rapid economic growth in major urban regions and high population settlement, have resulted in decreasing residential land area.

This has brought more pressure on cemetery land in these urban regions. Cremation establishments in urban areas in Hanoi and Hai Phong, which have been used for a long time, resulting in diminishing operation efficiency, now fails to satisfy increasing demand for cremation. Investment in purchasing cremators in these cremation establishments was carried out and had been used from long time ago, therefore the technology and technical specifications at the time of investment may not keep pace with the increasing of cremation demand. Due to the limitation in investment cost, investment must be split into phases, causing the available cremators to operate continuously to fulfill the cremation demand. In general, the rate of cremation use is growing, together with the number of cremating, the continuous use of the cremators and inadequate attention to maintenance are the causes of decreasing in operating efficiency.

No.	Province/City	Number of cremation establishments	Birth rate ‰ (2014)	Mortality rate (2014)	Percentage of cremation use (%)	Number of cremators
1	Hanoi	2	18.9	6.6	65	14
2	Bac Ninh		22.3	7.4		
3	Hai Phong	1	18.4	8.4	32	2
4	Hai Duong	1	16	7.0		
5	Hoa Binh		19.5	6.9		
6	Bac Giang		21	6.9		

Source: [4]

To resolve the pressure on cemetery land area in urban regions and meet the increasing demand for cremation, the cremation technology at cremation establishments are regulated to follow modern cremation technology, ensure environmental standards and technical specifications (Chapter IV – Government’s Decree No. 23/2016/NĐ-CP on Construction, Management and Operation of Cemeteries and Cremation Establishments dated April 05, 2016). The Minister of Natural Resources and Environment issued environmental technical specifications of cremation establishments; and any cremation technology which is initially applied in Vietnam shall be evaluated by the competent state agency. The Minister of Science and Technology, in corporation with the Ministry of Construction, Ministry of Natural Resources and Environment shall execute the evaluation of any cremation technology which is initially applying in Vietnam.



Figure 2: Cremation establishments in major cities fail to meet environmental protection requirements



Figure 3: Degradation of waiting and ceremonial rooms of cremation establishments in major cities that fail to meet the demands of the population.

2.1.4. Planning procedure for cemetery construction in Vietnam

The procedure of planning for cemetery construction includes seven steps as follows:

Step 1 – Determine cemetery borders, survey and evaluate the current land status which is planned for cemetery construction, including the following tasks:

- Determine borders of the planned land for cemetery construction;
- Investigate, evaluate current status of the planned area for cemetery construction;
- Evaluate the current land use, landscape architecture, socio-economy and technical infrastructure, and environment of the planned area for cemetery construction.

Step 2 – Determine burial methods, scale, characteristics and land use norms, including the following tasks:

- Determine the cemetery characteristics
- Select burial methods
- Forecast cemetery scale.

Step 3 – Plan land use and landscape architecture, including the following main tasks:

- Requirements of land use and landscape architecture planning
- Plan major functional areas in the cemetery.
- Specify size and design of tombs and tombstone; and requirements for designing works in the cemetery;

Step 4 – Plan technical infrastructure

The main tasks in this step include determining requirements and specific contents in technical infrastructure planning in the cemetery such as ground-leveling, traffic system, water supply, water drainage, solid waste and exhaust gas treatment, power supply and communication system.

Step 5. Evaluate strategic environment.

Step 6 – Consult the community.

Step 7 – Prepare documents to submit for evaluation and planning approval .

It can be inferred from the above procedure that the application of advanced cremation technology in cemetery projects is the most important factor, determining the selection of location and bordering (Step 1), ensuring environmental regulations (Step 5) and receiving high approval from people around the project area (Step 6).

2.2. Planning model of cemetery and cremation establishment in Japan

- Japan is the country with very high cremation rate (99.9%). At present, Japan owns highly advanced cremation technology, which involves the use of gas and diesel to replace old-fashioned technology that uses electricity, diesel and firewood to cremate.

- Japan is applying the environment-friendly cremator system, combining the funeral chapel and the crematorium, and applying the synchronized management system of funeral service, etc.



Figure 4: Model of a cemetery park in Japan

2.3. Comparisons between Vietnamese and Japanese cremation technology

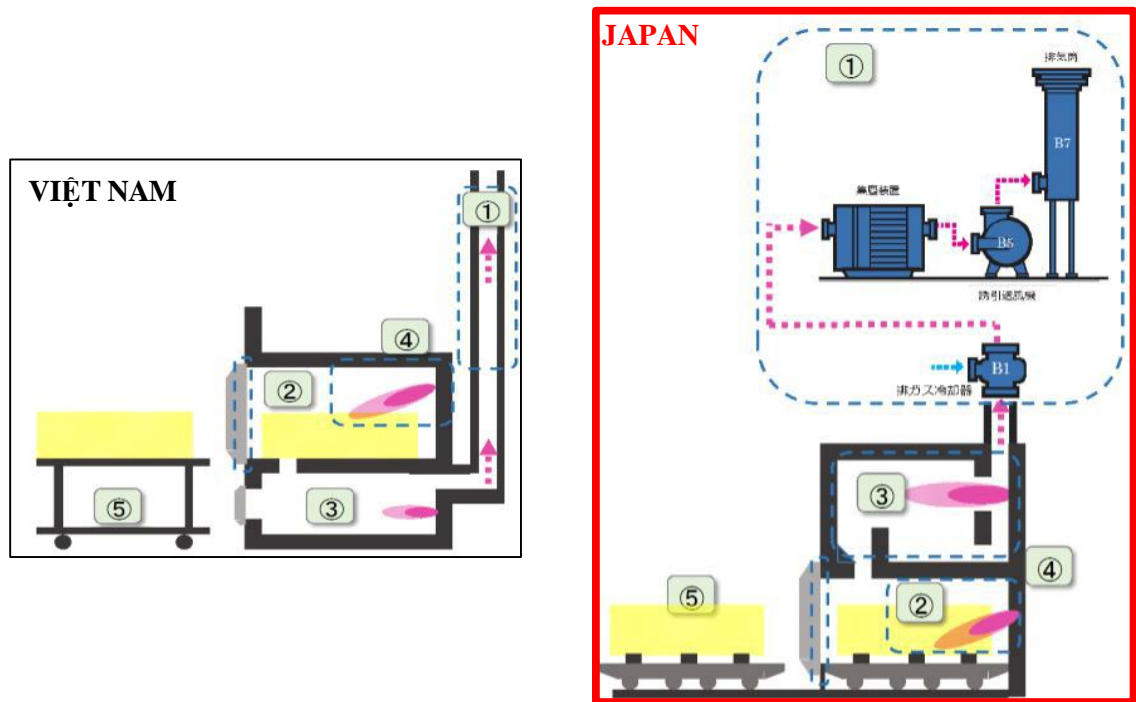




Figure.5: Diagrams of Vietnamese and Japanese cremation technology

Table 2: of comparisons between Vietnamese and Japanese cremation technology

	Vietnam	Japan
1 Exhaust gas treatment equipment	<p>Discharge gas directly from the sub burning chamber -Dust and soot are released into the open air without treatment. Exhaust gas at high temperature is discharged into the air. - Unstable burning as not being compulsive gas discharge.</p>	<p>Install equipment which mitigates environmental impact - Exhaust gas chiller Prevent re-synthesis of dioxins thanks to quick cooling of exhaust gas Restrict hot gas discharge into the air. - Dust-collecting device Additional dust and soot collecting device. - Attractive ventilator Stable burning in the burning chamber thanks to compulsive gas discharge.</p>
2 Main burning chamber	<p>Burning device -Takes time due to indirect contact between the fire and the corpse. Door - Door not tightly closed, causing smoke, high temperature and dust from the burning chamber to escape, which badly affects the working environment.</p>	<p>Burning device -Short cremation time thanks to direct contact between the fire and the corpse. - Coffin placed on a cart, reducing cremation time. Door - Door tightly closed, preventing smoke, high temperature, and dust from escaping, not badly affecting the working environment.</p>
3 Sub burning chamber	<p>Burning device -Unable to completely dissociate exhaust gas due to small volume. (Japanese exhaust gas standards)</p>	<p>Burning device -Processing in the sub burning chamber at high temperature, big volume with convectional design, enabling complete dissociation of polluting substances.</p>
4 Temperature of cremator body	<p>Temperature of cremator surface -High cremator surface badly affects the working environment.</p>	<p>Temperature of cremator surface -Low cremator surface does not affect the working environment.</p>
5 Coffin cart	<p>Moving the coffin into the cremator -Staff pushes the coffin into the cremator by hand.</p>	<p>Moving the coffin into the cremator -Transport automatically thanks to the carts in the cremator.</p>
Photo of actual works		

2.4 Model of cemetery planning and cremation establishments in Japan

Thanks to the modern technology and strict control requirements of gas emission set at high level, Japanese cremation establishments can be located in residential areas. Therefore, these cremation establishments are often located in areas convenient for traffic.

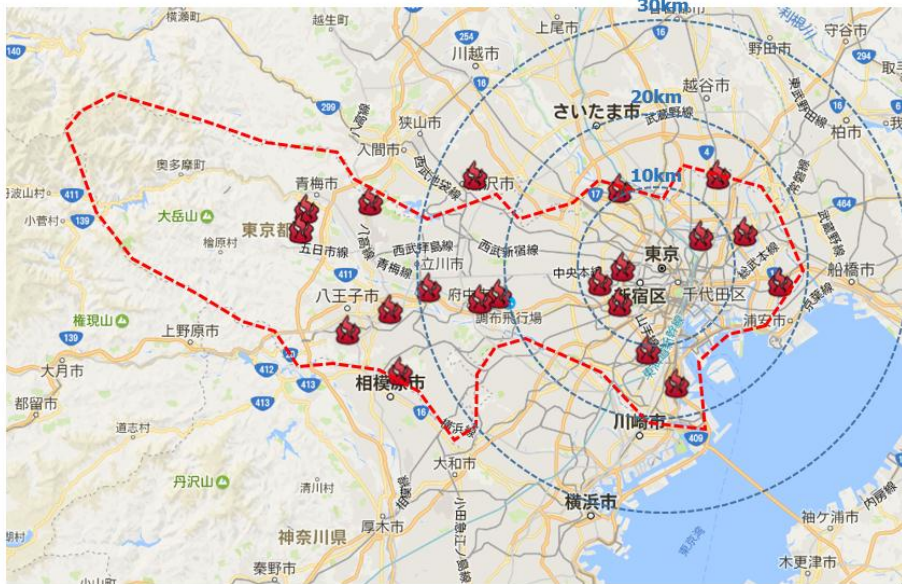


Figure 6: Locations of cremation establishments in Tokyo, Japan



Figure 7: Cremation establishment in a residential area of Japan (Kanazawa-shi-Minami establishment)



Figure 7: Japanese cremation system with modern emission treatment equipment

The cremation bases in Japan are modern and civilised, which makes it convenient for people to select and use them.



Figure 8: Modern cremation establishments in Japan

3. Proposal of construction of cemetery park model and recommendations to promote investment in development of cremation establishments

Pursuant to Decision No. 2282/QĐ-TTg by the Prime Minister on the approval of the project to encourage cremation in order to gradually turn cremation into the common burial practice among Vietnamese in all regions throughout the country with the civilized and advanced approach to save land and protect the environment, the general objectives of cemetery planning in Vietnam are proposed as follows:

- Cemetery planning shall conform construction planning and current technical specifications; conform traditional customs, practices, religions and modern civilization; and employ land effectively, ensure requirements for landscapes and environmental sanitation.
- Cemetery construction in a concentrated model.
- Current cemeteries in urban regions shall be closed after using up all land, followed by planting trees and renovating into cemetery parks to protect natural environment and ensure solemn atmosphere which is suitable for remembering the deceased people.
- Cremator construction is encouraged with the aim to ensure environmental sanitation, reduce land use and satisfy population growth.

Therefore, to succeed in executing the above aims, the following tasks should be performed at the same time:

3.1 Planning and construction of cemetery parks and cremation establishments

In order to promote the use of cremation, save land resources and protect the environment in major cities, it is necessary to plan cremation cemeteries and cremation establishments in locations that are convenient in terms of transportation. Clean and modern cremation establishments should be constructed to encourage residents to select cremation over burial.

3.2. Technical regulations applicable to cemetery and cremation establishments

The current regulations on the required distance between cremation establishments and residential areas of Vietnam are making it impossible to find locations that are convenient in terms of transportation to and from the cremation establishments. This is one reason why investors have not invested in cremation establishments in major cities: potential investors are concerned that the unfavourable locations will cause residents to be reluctant to use their establishments, which will make capital recovery difficult.

These high isolation standards for cremation establishments are due to the fact that cremation establishments have a negative impact on the surrounding residences because they fail to meet environmental requirements. It is therefore necessary that cremation establishments comply with strict emission standards. This would meet the high environmental requirements of the Vietnamese government, and allow for shorter distances between cremation establishments and residential areas.

3.3 Co-operation between government and enterprises, and the incentive for enterprises to invest in cemetery and cremation establishments

Utilisation of the land fund to construct cremation establishments is difficult for enterprises because it is often opposed by residents due to belief that cremation has a negative effect on the environment and the landscape. In Japan, cremation is an essential public service provided by the government to all residents. Therefore, the Japanese government provides land and infrastructure for cremation establishments and residential mobilisation so that enterprises can invest in these establishments.

Currently, the Vietnamese government has issued a policy of granting land to enterprises investing in cemeteries and cremation establishments in Ho Chi Minh City. The authorities of other major cities in Vietnam should study and implement this policy to encourage investment.

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¹ and ² ACUD Construction and Investment Design Consultancy, JSC

³ and ⁴ Nikken Sekkei Civil, Ltd

Email: bachngoctung@acudgroup.vn

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