

Experimental Alternatives to Traffic Congestion At Dwarka

A Socio-Environmental Approach

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Abstract - The physical infrastructure plays an important role in any nation's development. In the recent period the infrastructure of Nasik has taken a boom with the construction of National Highway, Arterial roads and Ring roads facilitating the infrastructural development of the city. The Dwarka circle can be considered as the Heart of Nashik city due to its core location amidst the central part of Nashik with approaches from all direction facilitating traffic to and from Nashik in all directions. The passage of Mumbai Agra Highway, Nashik Pune highway, Mumbai Agra flyover, and several arterial roads and an unorganized and indisciplined traffic in conjunction with illegal encroachments and hawkers have created a major traffic congestion issue which is hampering the just-cause of providing such exorbitant infrastructure facilities and has led to the wrath of public and allegations from political, commercial and common masses which is envisaged through repetitive media reports and agitations.

Keeping in view the Social and Environmental approach and a need to provide comfort to the commuters and enhancing the infrastructural facilities at Dwarka circle, an attempt has been made to compare and provide alternative solutions to the malignant bane of traffic congestion at Dwarka Circle and for the betterment of lifestyle of people commuting over there and residing in nearby areas

Keywords— *Alternative solutions, core location, exorbitant infrastructure, illegal encroachments and hawkers, indisciplined traffic, socio-environmental approach, wrath of public.*

INTRODUCTION

The Dwarka Circle is one of the busiest junctions in the city where the Mumbai-Agra national highway intersects the Nashik-Pune highway. For most part of the day, all the sides of the Dwarka junction are chock-a-block with vehicles. Motorists commuting through the Dwarka junction on a regular basis said that they had to wait for at least 15 to 20 minutes daily at the junction in the scorching sun. Traffic congestion has become a routine problem at the junction despite the four-lane elevated corridor, the six-lane main carriageway below it, the twin service roads and the subway for pedestrians.

Major Congestion on Dwarka Circle is from CBS Road to Nashik Pune Road and from Nashik Pune Road to CBS Road. About 50% of the traffic on circle is contributed by these two routes.

For the free undisturbed movement of pedestrian there is an under passage constructed but due to insufficient light and

ventilation people are not using it. So the construction of under passage is a total sheer waste and unusable. However this under passage could be exploited for diverting two wheeler traffic from Nashik Pune Road to CBS Road and from CBS Road to Nashik Pune Road and thus segregate the two wheeler traffic



At Dwarka circle, the flyover is having entry & exit points hence the mixed traffic condition occurs. Separate lanes should be provided for different direction. From the accident analysis, it has been observed that more accidents occur during day time. The factors contributing to the accidents are mixed traffic, poor road geometry, lack of traffic sense, disobedience of traffic rules & regulations, climatic conditions, habits & negligence of driver. To reduce the number of accidents, one way or two way traffic system should be defined. Traffic regulation policies should be defined during rush hours. This will reduce the accidents on black spots considerably.

The Classified Volume Count is calculated by measuring the number of vehicles from time 6 am to 10 pm. The classified volume is calculated by manual method on daily basis on the study stretch. At the study area the number of two wheelers users is more as the service connects the core of the city &

Industrial area and the people in the nearby area uses the two wheelers to go to work. The heavy vehicles & cars are diverted mostly to the flyover.

Particular	Traffic Count	Composition of vehicles in %
Car / Jeep / Van / Taxi	26134	30.11%
Two Wheeler	35063	40.4%
Auto Rickshaw	10730	12.36%
Buses	4201	4.85%
Minibus	858	1.0%
LCV	6029	6.94%
2-axle Truck	1368	1.57%
3-axle Truck	853	0.98%
MAV	742	0.85%
Agricultural Tractor	148	0.17%
Slow moving vehicles	664	0.77%
Total Vehicles	86790	100%

As can be observed from the above table cars, auto rickshaws and 2-wheelers are the dominant mode during peak hours, which all together contribute around 80% of total traffic. Reasonable numbers of bus and goods vehicles are also observed at the intersection.

OBJECTIVES

1. To study the traffic patterns prevailing at Dwarka Circle.
2. To identify the causes of traffic congestion.
3. To study the existing infrastructure facilities and to arrive upon judgmental reasons for the occurrences of traffic congestion and accidents.
4. To provide a feasible solution by suitably planning the use of existing facility or attempting to modify the existing facility or providing an altogether new solution for improvement of traffic situations in and around Dwarka Circle.

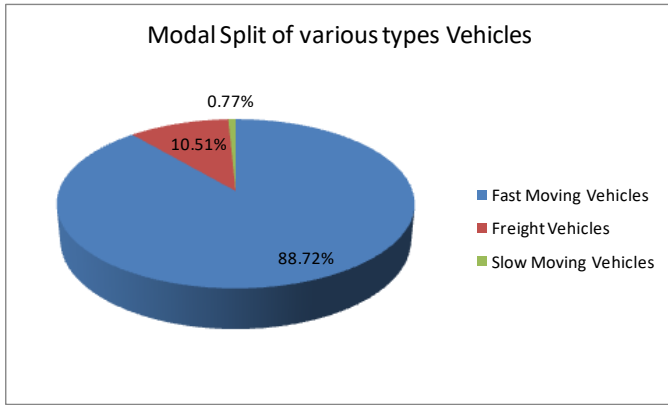
TRAFFIC VOLUME COUNT ON DWARKA CIRCLE

The classified volume count of the Dwarka Junction is calculated by measuring the number of vehicles from 6am in morning to 10pm in evening. The classified volume is calculated by manual method on daily basis on study stretch. Detailed study conducted at physical site was accompanied by collecting traffic data and accident data from concerned authorities such as traffic authorities, corporation, PWD and NHAI officials, local newspaper and relevant research paper on this issue.

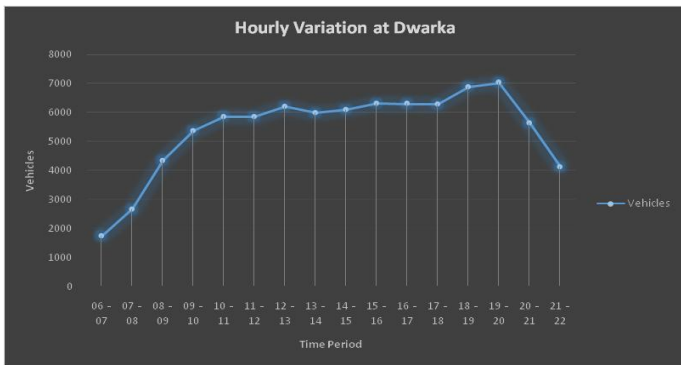
At the study area i.e. on Dwarka Circle the number of two wheelers are more as the city and industrial area and the people generally use two wheelers to go for work. The heavy vehicles and cars are diverted mostly on the flyovers.

Time period	Fast Moving vehicles					Freight vehicles					Slow moving Vehicles	Total Vehicles	Peak hour traffic
	Car / Jeep / Van / Taxi	2-Wheeler	Auto-Rickshaws	Buses	Mini Bus	LCV	Truck (2-Axle)	Truck (3-Axle)	MAV	Agricultural Tractor Trailer			
06 - 07	422	561	244	160	43	161	46	27	27	10	52	1753	2.3%
07 - 08	682	961	385	194	59	197	50	34	28	15	56	2661	3.3%
08 - 09	1161	1727	592	264	61	313	74	58	42	10	54	4356	5.2%
09 - 10	1503	2151	618	351	51	413	98	62	57	9	59	5372	6.4%
10 - 11	1749	2321	691	374	47	432	96	61	51	7	42	5871	6.9%
11 - 12	1704	2389	658	299	58	439	124	68	64	10	44	5857	6.8%
12 - 13	1883	2544	762	287	53	418	97	59	61	9	33	6206	7.1%
13 - 14	1809	2454	761	243	54	437	96	64	45	4	23	5990	6.8%
14 - 15	1838	2499	776	255	50	462	90	51	45	2	39	6107	6.9%
15 - 16	1973	2583	762	301	59	419	94	50	46	7	28	6322	7.2%
16 - 17	1945	2572	764	290	49	444	98	63	48	7	26	6306	7.2%
17 - 18	1976	2521	740	304	48	475	82	49	48	7	33	6283	7.2%
18 - 19	2132	2857	854	298	54	457	92	49	54	13	36	6896	7.8%
19 - 20	2171	2892	903	252	60	489	107	60	49	11	46	7040	8.0%
20 - 21	1826	2431	689	162	60	258	61	56	38	11	43	5635	6.2%
21 - 22	1360	1600	531	167	52	215	63	42	39	16	50	4135	4.7%
Total Vehicles	26134	35063	10730	4201	858	6029	1368	853	742	148	664	86790	100.0%
Modal Split	30.11%	40.40%	12.36%	4.85%	1.00%	6.94%	1.57%	0.98%	0.85%	0.17%	0.77%	100.0%	

Detailed Traffic Volume Count



Modal Split of various types of vehicles



Hourly Variation at Dwarka

METHODOLOGY

The available data indicates that the traffic may be categorized as follows in the broad sense-

Two wheelers –	40.40%
Light Traffic –	49.41%
Heavy Traffic –	9.42%
Other Traffic –	0.77%

Further based upon Entry and Exit of vehicles the traffic can be broken up into the following percentage –

Towards Mumbai –	20%
Towards Pune –	26%
Towards CBS –	24%
Towards Dhule –	24%
Towards Old Nashik–	6%

Major portion of 2 wheeler traffic is observed plying on Pune to Nashik CBS and Nashik CBS to Pune road. As these arms connects the Nashik city with Nashik Road section which have a substantial to and fro movement for education, occupation, and commercial purpose. Upon detailed analysis of the data available and prevailing traffic condition, primarily it seems necessary to segregate the traffic which may reduce the congestion to some extent. Adopting corrective measures such as public awareness, encroachment removal, creating no hawker zone may also help in improving the traffic conditions at these locations, based upon the analysis of available data and site observation, and certain alternative solutions are enumerate to improve the traffic conditions of traffic congestion at Dwarka Circle.

ALTERNATIVE SOLUTIONS :-

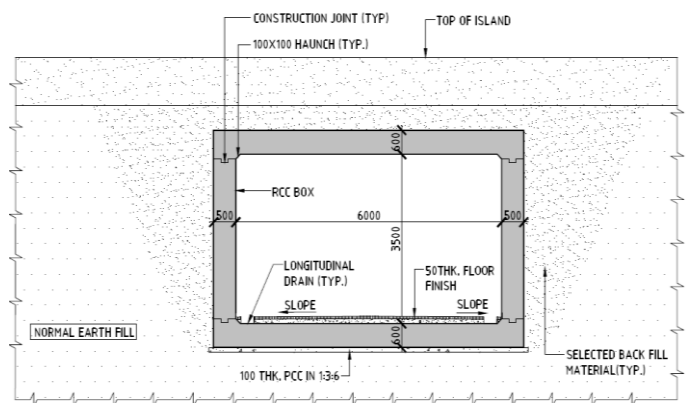
1. Utilizing the existing facility with some corrective measures.
2. Modification of Pedestrian Subway into a two wheeler vehicular underpass.
3. Reconstructions of vehicular underpass for light vehicles and two wheelers.

UTILIZING THE EXISTING FACILITY WITH SOME CORRECTIVE MEASURES

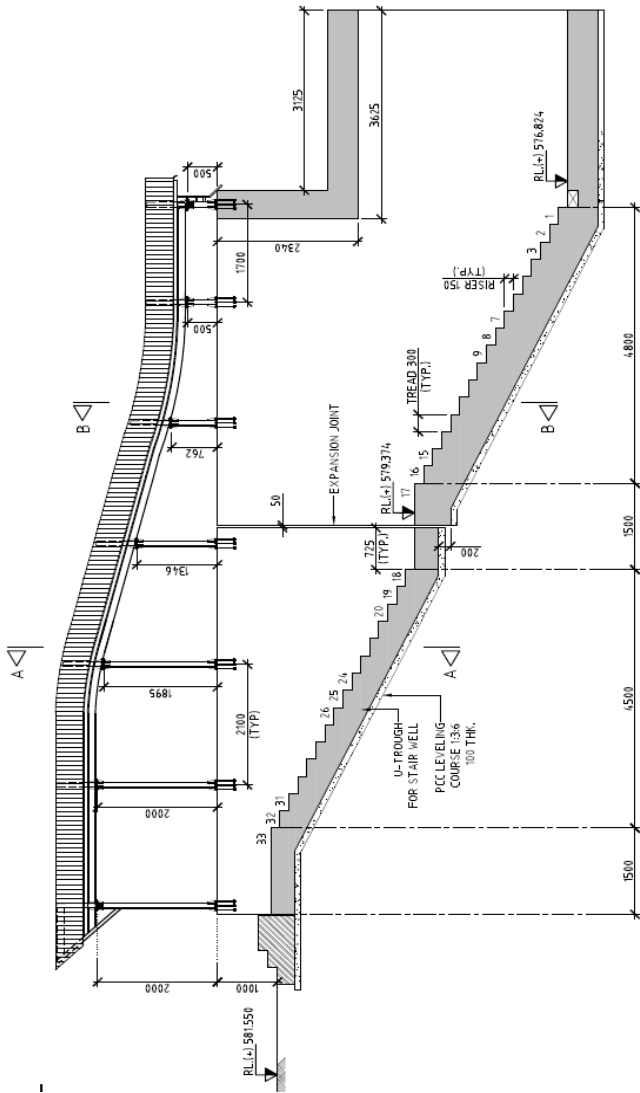
- Removal of encroachments.
- Compelling the pedestrians to use pedestrian subway for crossing the highways.
- Repositioning of existing pick up shades and authorized bus stops away from the circle.
- Restriction of unauthorized parking in the vicinity of junction.
- Permitting two wheeler traffic over fly over which will help in reduction of two wheeler traffic mixing with other traffic at the junction.
- Removal of unauthorized street vendors and hawker from the circle and nearby area.
- Relocation of authorized and unauthorized rickshaw and taxi stands.
- Providing adequate road safety measures and road side furniture for traffic channelizing and traffic regularization.

MODIFICATION OF PEDESTRIAN SUBWAY INTO A TWO WHEELER VEHICULAR UNDERPASS

It has been observed that out of the total 2 wheeler traffic, approximately 10 - 15% of 2 wheeler traffic moves from Pune road to Nashik CBS road. Segregating this traffic from other traffic will surely help in reduction of chaos and traffic condition at junction. Beneath the rotary island, there is a pedestrian survey of 6 meters width and 3.50 meters clear height (Head Room) having access points in different directions.



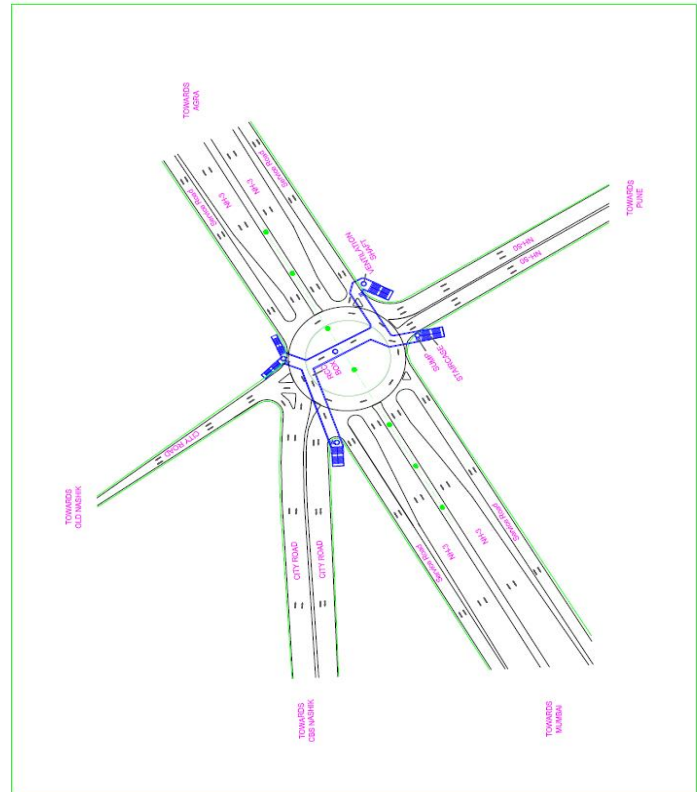
Existing Pedestrian Subway Box Structure



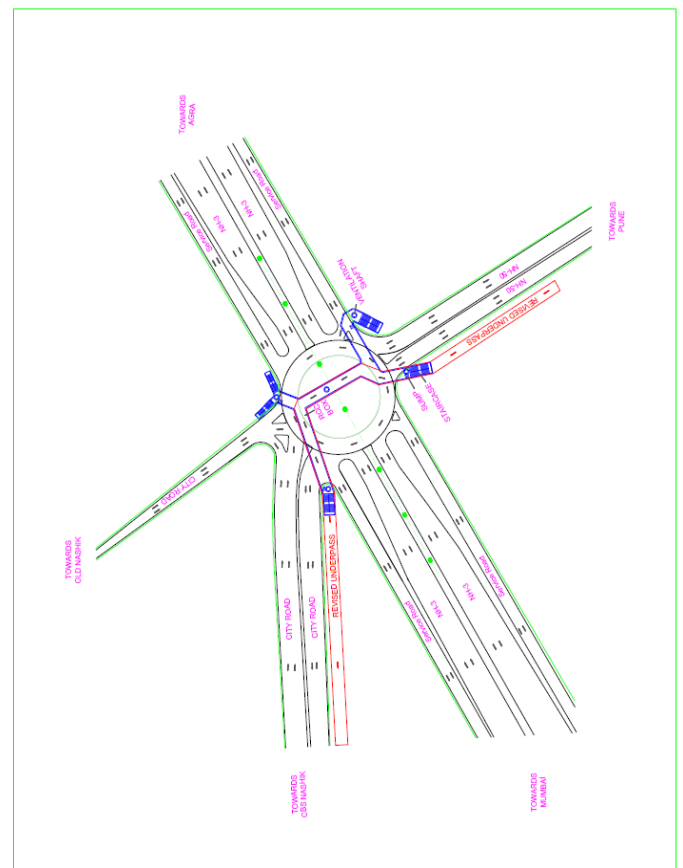
Existing Pedestrian Subway Staircase

For facilitating the separation of this two wheeler traffic, the pedestrian subway can be effectively used with some minor alteration in its structure as enumerated below:

- The pedestrian staircase on Pune road side and Nashik CBS road may be demolished and converted into a ramp for two wheelers having a permissible gradient of 1:25 to facilitate smooth entry and exit of two wheelers into the subway.
- Installing height barriers, road width barriers to restrict other vehicles from entering the subway.
- Provide safety crash barriers inside the subway on turning portions to avoid collision and alongside the ramp walls.
- Providing adequate safety measures to ensure safety of two wheelers on exit and entry points into the subway.
- Improve the ventilation of subway to cope up with the possible increases in pollution in the subway due to exhaust from two wheeler.
- Improve the illumination facility inside subway.
- Providing adequate road safety measures and road side furniture for traffic channelizing and traffic regularization.



Existing road and Subway Plan.



Revised Underpass Plan.

RECONSTRUCTION OF SUBWAY FOR LIGHT VEHICLES AND TWO WHEELERS

In detailed observation of site situation and traffic data, it is observed that approximately 15% are cars and 20% are two wheelers are moving from Pune road to CBS road and vice-versa.

To provide a permanent solution to the chaotic situation at Dwarka circle, it is necessary to segregate this traffic of Pune Road - Nashik CBS road from other vehicular traffic.

This separation of traffic can be achieved by removing the existing pedestrian subway and reconstructing a new vehicular underpass for the passage of light vehicles, 4 wheelers and two wheelers beneath Dwarka Rotary Island.

There will be two pairs of underpass. One connecting Pune Road traffic to Nashik CBS Road and another connecting the Nashik CBS Road to Pune Road.

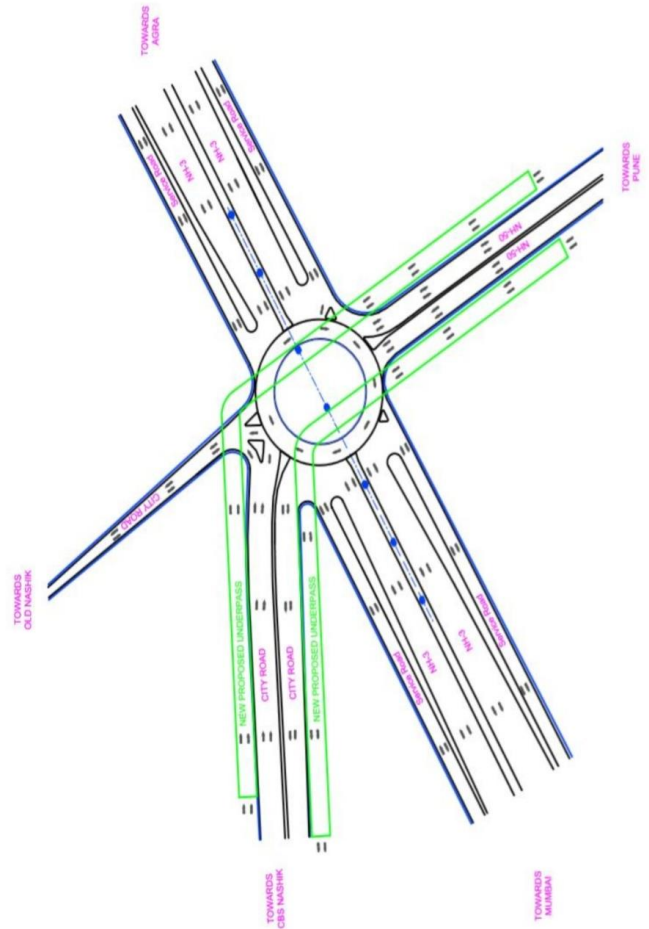
The clear height of the Underpass will be 3.5m which is sufficient for light vehicular traffic but there will be a height barrier at 2.5m so to ensure safety and restrict unwanted heavy vehicles from entering the underpass.

The clear breadth of the underpass will be 12m so that at the same time 2 lanes of cars and a single lane of 2 wheeler can pass undisturbed.

The ramps of the underpass will have a slope of 1:25 so safety is assured.

For facilitating the use of Underpass there are some points listed below:

- Provide safety crash barriers inside the subway on turning portions to avoid collision and alongside the ramp walls.
- Providing adequate safety measures to ensure safety of two wheelers on exit and entry points into the subway.
- Improve the ventilation of subway to cope up with the possible increases in pollution in the subway due to exhaust from two wheeler.
- Improve the illumination facility inside subway.
- Providing adequate road safety measures and road side furniture for traffic channelizing and traffic regularization.



Proposed Underpass Plan.

CONCLUSION

Due to alarming rate of increase in traffic at the core of Nashik city i.e. at Dwarka junction, we the student of K. K. Wagh Polytechnic have opted for solving this day-to-day life problem faced by every passing by person through the circle. We have suggested few methods for this reduction of traffic like firstly utilizing the existing facility with some corrective measures like Removal of encroachment, compelling the pedestrians to use pedestrian subway for crossing the highways, repositioning of existing pick up shades and authorized bus stops away from the circle, restriction of unauthorized parking in the vicinity of junction, permitting two wheeler traffic over fly over which will help in reduction of two wheeler traffic mixing with other traffic at the junction. Also removal of unauthorized street vendors and hawker from the circle and nearby area, relocation of authorized and unauthorized rickshaw and taxi stands, also by providing adequate road safety measures and road side furniture for traffic channelizing and traffic regularization.

Similarly the second method comprises of just to give ad-on's comprising of demolishing the staircase and providing a ramp of gradient 1 in 25 i.e. for every one meter rise/depth there is a five meter required horizontal width. So for 1 in 25 slope,

125 meter lengthening of road to be done so as for proper and sophisticated passage of two wheelers through the circle. This will help to reduce approximately 20% of traffic of the city. As the idiom says, "Something is better than nothing." This means that even if there is reduction of 20% traffic, there will be reduction and sufficient traffic reduction and thus leading to solving accidental problems throughout the city.

Also by providing whole new plan as mentioned in the above section 3.3 stating whole new construction of underpass by increasing road width to 12m, thus reducing the traffic congestion and hence leading to reduction of pollution by standing vehicular emission, saving the quality time, petrol and good amount of money which can be used for development of nation.

So when there will be 50% reduction in traffic, then there will be lesser number of constables required for traffic control. So as this will help in properly utilizing them for some constructive purpose instead of making them stand in scorching sun.

Hence this leads to an enormous saving of precious time, good amount of money and unnecessary utilization of resources. Also according to a SOCIO-ECOFRIENDLY APPROACH it is seen that social aspect is covered because hampering of humans take place and ecofriendly means saving of our environment from depletion.

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