Analysis & Planning of 2-Wheeler Parking Facility near Railway Station

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Abstract: There is increase in vehicular use, the need of parking space and facility is required. The present scenario of parking facility gives rise to illegal parking at the road shoulders reducing the effective use and efficiency of road. Which further leads to traffic jam. Considering above problem's proper facility is required for which kandivali railway station was selected as study area. During the field survey it was found that kandivali local-railway station is one of the stations where the parking area is insufficient especially for 2-wheelers to overcome the above problems a multilevel parking is to be designed within the available spaces at kandivali local railway station. Multilevel parking will enable the parking of bikes, floor after floor and thus reducing the space. By using the multilevel parking plan we can reduce the parking congestion, where we can park more than 3000 bikes at a time which is much far better than present parking capacity (<550 bike). And thus additions will be made to the existing parking system to ensure maximum space utilization.

Keywords: Parking area, Railways, Public transport, Multistory parking.

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I.   INTRODUCTION

Yearly urban populace development rate in most recent two decades has been normal development by more than 1%. Urban populace constitutes more populace out of which 41% dwells in metropolitan urban areas. In metropolitan urban communities decades prior, the rate of bikes was as high as 75%, on a normal bikes deals enlisted development of 9 percent in April-walk 2015 over April-walk 2014. Inside the 2wheelers portion, bikes, bikes developed by 25.06 percent, 2.50 percent and 4.51 percent separately in April-walk 2015 regarding April-walk 2014. All in all, a vehicle stays in stopping for 8360 hours out of 8760 hours in a year (5% of the time in a day).

There is a need to guarantee accessibility of parking spot in any event for about 22 hours in day where just vehicle is found in operation for two hours out of 24 hours in a day. It implies at whatever point another vehicle is added to the road, it implies that extra interest for stopping office is included the city. The procurements of parking spots should be advanced occasionally with urbanization and quick mechanization, which is making the urban communities denser and with arranging and usage will evacuate the bottlenecks which might be future high thickness improvement in future connected with high land cost. Every one of the urban areas in India face serious stopping issues. Because of mysterious increment of activity in India, stopping has turned into the new issue alongside contamination and low quality streets. The interests for parking spots aresoar. This is particularly on the grounds that the infra-auxiliary development of Indian urban areas which can't stay aware of the developing interest for spaces to stop.

The principal address that experience while clarifying undertaking is "what is the need of multilevel stopping framework? The response for above inquiry would be stopping all the more no vehicles in restricted accessible

room and space limitation is the real goals of this anticipate. Because of absence of parking spot availability individuals tend up to stop their vehicle on streets or close-by zones of railroad station which create clog and congested driving conditions. The accessibility of less space in urban regions has expanded the interest for parking spot particularly in territories like railroad stations since it is the main center for people groups to move starting with one place then onto the next which gives simple and adaptability to network of different attempts to do.

The MSRDC has parking garages at 17 distinct areas, similar to JV join street, sion, chhedanagar, elphinstone street and vikroli, for the most part beneath flyovers consequently as we structural architect giving some assistance to our legislature to fabricate multi-story stopping close railroad station as its life saver for Mumbai as conclusive year venture to help natives.

II.   OBJECTIVES

The objective of the present study was to study existing parking conditions, to carry out parking studies, to formulate strategies for better management for parking.

III.   PROFILE OF STUDY AREA

Various suburban station were assessed to find a particular site which faces a severe congestion of traffic and parking issues for 2-wheelers specially. Following vasai, mira road, thane, bhayander, kandivali and many other sites were visited to check which site is the most appropriate for parking development. Thereafter kandivali station was selected as site for parking development.

Fig.1 satellite view of site (Kandivali railway station)

The study was carried out at kandivali railway station parking lot and 250 meters radius around the parking. As per parking studies normskandivali railway station is a busy station along the western line on the mumbai suburban railway. Poisarbus agar is one of the oldest best bus depot located in kandivaliwest (s.v. road), western express highway is on the east which is connected by roads, were on west side s.v. road and link road are present. The best bus depot is just in frontof the railway station on the eastern side of the suburb which is the point of origin for localities ofkandivali east like ashoknagar, hanuman nagar, damunagar, samatanagar, thakur village and thakur complex. Bus services also hand out distant destinations like kashimira and borivali.

Fig.2 plot area of site

Fig.2 shows that plot area of the site for which the survey is conducted. It has area of **1029.60 sq.m**.with an fsi of **2**. Which is under railway authority?

IV.   SURVEY PROCEDURE
The survey was conducted in two stages i.e.Site Reconnaissance Survey and actual survey.
Under Site Reconnaissance Survey as shown in fig.2 the current scenario of the site was observed and the capacity of the site was noted, over loading of the vehicles which are without parking and trying to find the solution for parking maximum vehicles. Further the site was surveyed for 250m radius and found that parking area was separated approx. 1 half by railway section.It was observed that the different lanes which are arriving at the site, were noticed that some

lanes were full with parking which were leading to congestion in road system and this problem can be easily solved by giving parking place. Then the lanes were combined into several combinations like 1-7a, 2-8, etc as per the requirements of survey.
The actual survey was done by parking usage survey by patrol. Under actual survey parking area count, lanes count and classified vehicles count, these three counts were successfully completed with the help of third year civil students of universal college of engineering, Kaman. They were divided into three batches. Survey conducted was of 15 hours according to the norms including peak hours. The day selected for survey was a midday which was unaffected from any public holidays, or any other factors. Dated 10th Feb, 2016 from 7.00 am to 9.00pm. Time was selected. Each group were provided with sheets to fill the appropriate data which vehicles were parked on street as well as off street. For records license plate number was taken. On surveying people were allotted in each lane, on every half an hour group of people were allotted to take a round of entire lane n taking record of each 2-wheeler vehicles parked in lane. For every next half an hour again group of people were allowed to take readings of the whether a particular vehicle is present at same location or not. Thus finding particular vehicles parked for number of hours at a particular lane
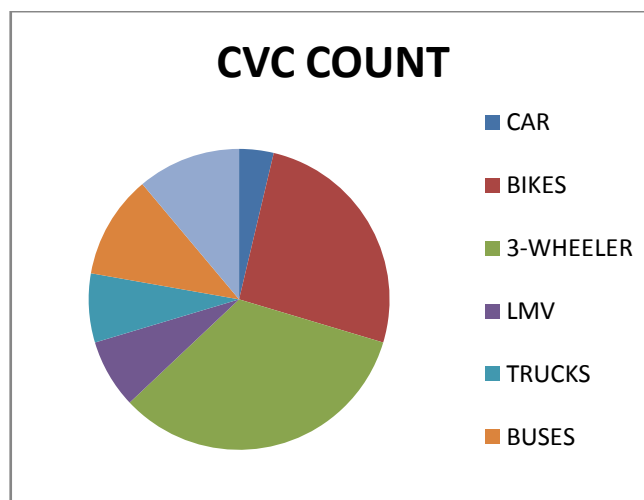
V.   CLASSIFIED VOLUME COUNT

Fig.3 Classified vehicle count.

Classified volume count was carried out for the full duration so as to know the traffic composition. It was carried out manually by group of 3 students on the main road opposite to the parking lot for interval of 5 minutes. It was simultaneously carried at all the students so as to understand the loss of vehicle in between if any. It was seen that maximum 3-wheelers and 2-wheelers were seen.

VI.   DATA ANALYSIS
After surveying for 15 hours data was analyzed in excel sheets and number of vehicles which required spaces for parking was counted. Accordingly pie chart for classified vehicle count, time v/s no of vehicles accommodation was made.

192

Table 1.Vehicles accumulation.

TIME DURATION	VEHICLE IN	VEHICLE OUT	VEHICLE ACCUMULATION
07.00am-07.30am	143	21	122
07.30am-08.00am	214	8	206
08.00am-08.30am	345	11	334
08.30am-09.00am	465	9	456
09.00am-09.30am	542	1	541
09.30am-10.00am	596	2	594
10.00am-10.30am	637	1	636
10.30am-11.00am	639	4	635
11.00am-11.30am	652	1	651
11.30am-12.00noon	650	2	648
12.00noon-12.30pm	655	6	649
12.30pm-01.00pm	669	2	667
01.00pm-01.30pm	674	5	669
01.30pm-02.00pm	681	3	678
02.00pm-02.30pm	689	4	685
02.30pm-03.00pm	698	2	696
03.00pm-03.30pm	697	7	690
03.30pm-04.00pm	702	1	701
04.00pm-04.30pm	712	1	711
04.30pm-05.00pm	714	7	707
05.00pm-05.30pm	712	3	709
05.30pm-06.00pm	707	7	700
06.00pm-06.30pm	695	15	670
06.30pm-07.00pm	685	16	669
07.00pm-07.30pm	584	115	469
07.30pm-08.00pm	506	86	420
08.00pm-08.30pm	413	109	304
08.30pm-09.00pm	327	92	235

Following is the data calculated and from this table the maximum capacity of the existing parking lot is able to know which comes nearby to 700 vehicles at optimum capacity.
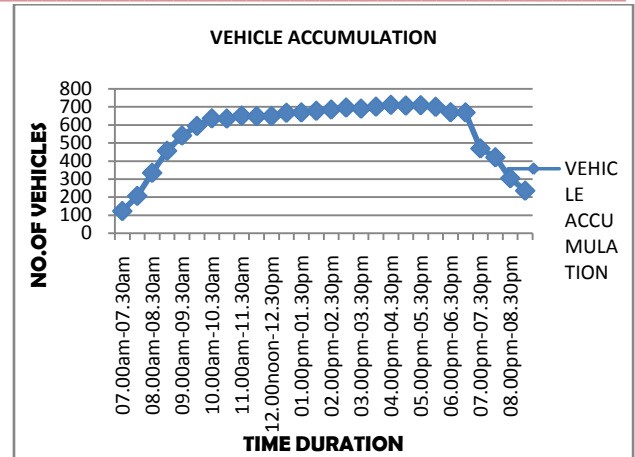

Fig.4 Vehicle accumulation.

Above figure shows the number of a vehicle which are entering and which comes out of the parking area which results in the accumulation of number of vehicles which are being parked for number of hours. Thus resulting in the highest number of vehicles i.e. 711 from 4.00pm to 4.30 pm and the lowest count of the area resulted to be 122 from 7.00am to 7.30am.it was assumed that more than 150 vehicles were send back as there was no space for parking in parking lot.
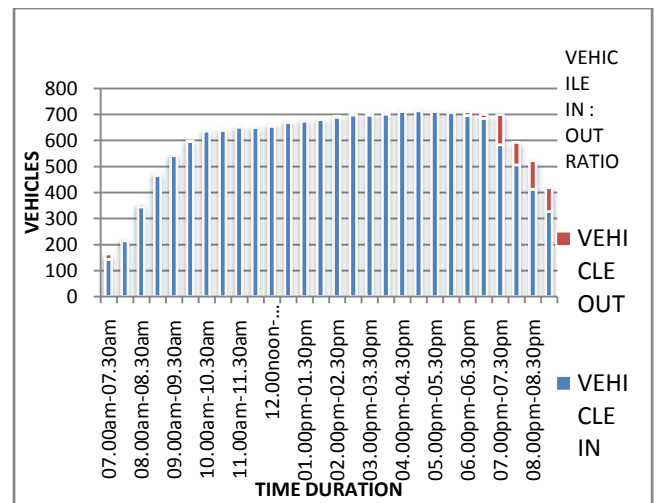

Fig.5 Time duration v/s in-out number of vehicles.

Fig.4 shows the number of vehicles entering the parking lot and the number of vehicles coming out of parking lot from every half an hour slot. It shows that that there is maximum intake of vehicles in morning hours and maximum outcome in evening hours i.e. from 7.00 am to 8.00am and 6.30pm to 8.00pm respectively. Its shows that already more than 100 vehicles are parked before the survey were started.
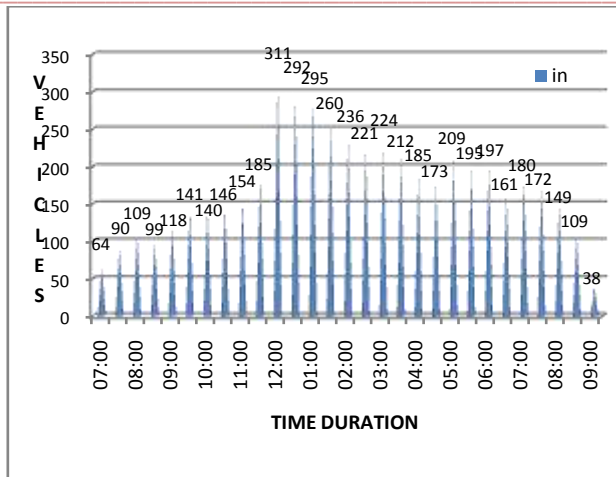
Fig.6 Vehicle accumulation in lanes.

Above figure shows the total count of the Vehicles parked in the area in each lane. This bar chart shows that From 12.00 noon To 1.00 pm there is maximum peak of 311 Vehicles parked in all lanes showing congestion and disturbing the government public transport system.

VII. PARKING DEMAND

As it has been calculated from analysis of survey data that in parking lot area even on having only capacity of 550 vehicles per day present scenario of parking vehicles, in which 711 vehicles are parked on an average and 150 and more vehicles are not allowed to park because of insufficient place of parking in addition to 311 number of vehicles parked in lanes which leads to congestion.

As there is 9% of growth rate of vehicles in 2014 to 2015 on an approximation number of parking vehicles required for 10 years if the growth rate doesn't changes will be more than 2038 vehicles.
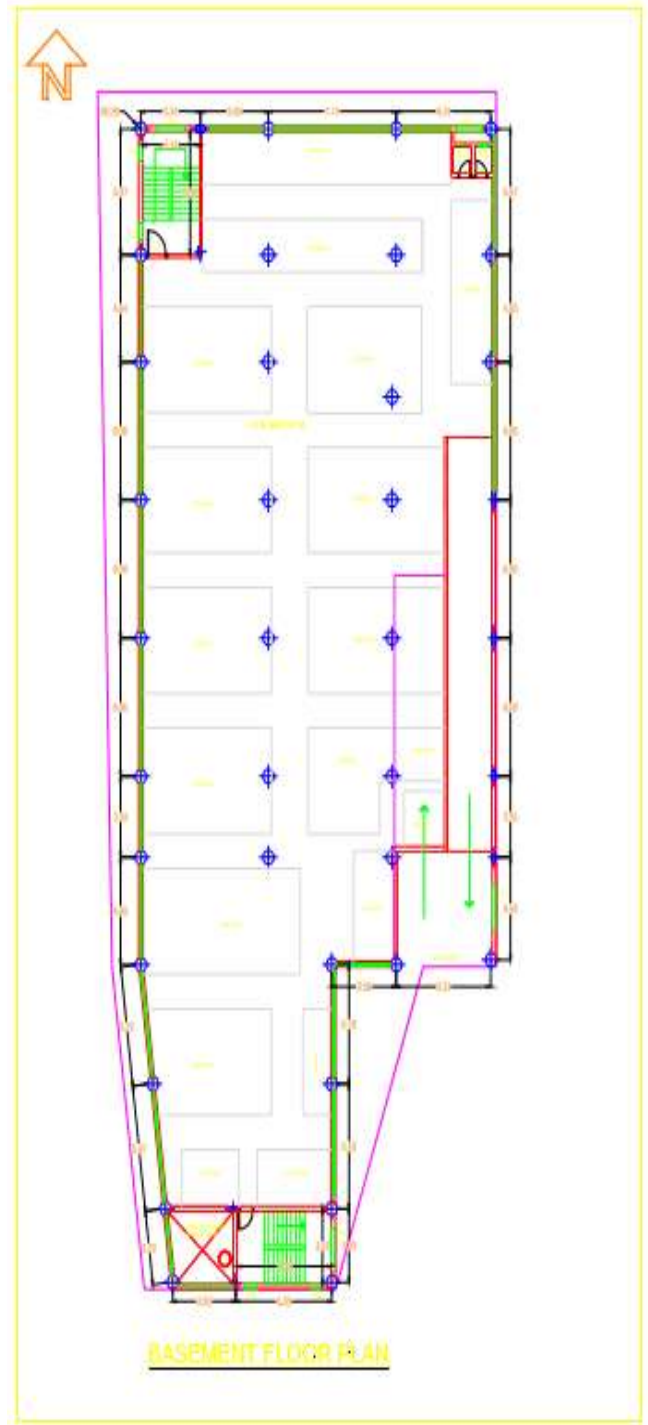
VIII. PLANNING

As per data obtained from survey and analysis done, G+2 with basement multilevel parking is planned.

Space for parking: As survey it was found avg. Space for parking.

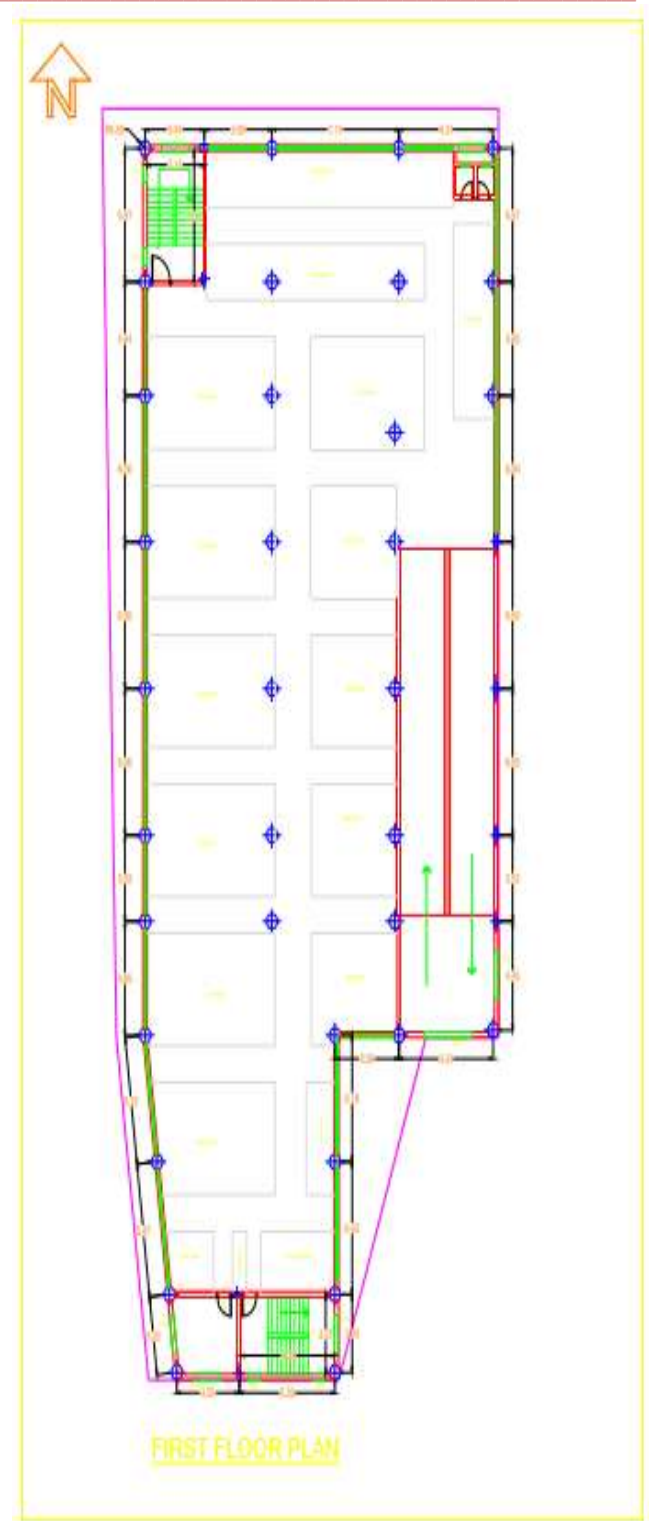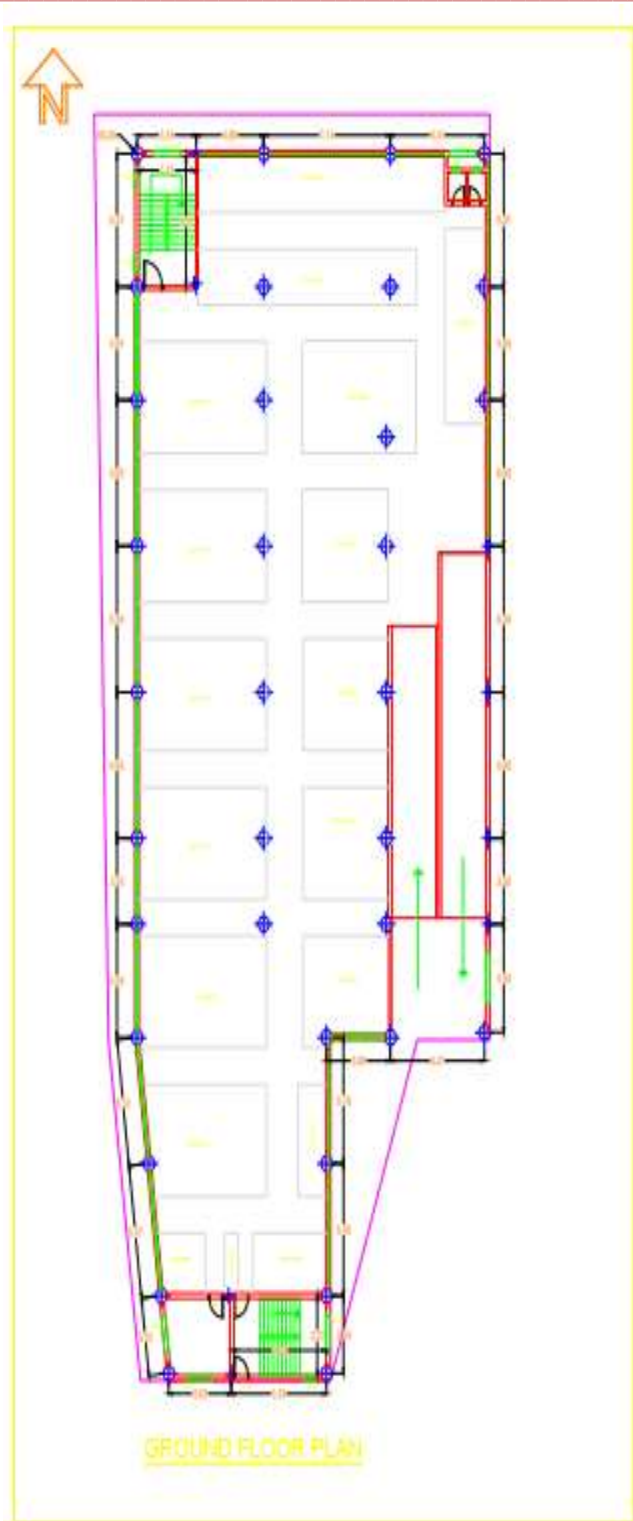| Type	Length	width
Non gear	1.9	0.7
MC with gear (125cc)	1.9	0.6
MC with gear(150cc)	2.1	0.7
MC with gear(180cc)	2.2	0.7
MC with gear(200)	2.2	0.7
MC with gear(220)	2.2	0.75

In the survey it was found that most of the bikes range from 125cc to 180cc .Therefore some specific area is given, such that there is variation in size of vehicle. So finally it was decided to give parking area size as 2.3*0.9

Basement floor plan

As plot area found is 1029.6 sq.m. Considering this area planning is done, with reference to above parking space the capacity of basement floor is planned for 260 bikes with drive way of 1.5m.

From ground floor to basement ramp is provided with slope of 1:10, ramps are provided of 1.5m width. Staircase is provided connecting basement with ground floor.

GROUND FLOOR PLAN

FIRST FLOOR PLAN

Ground floor plan

As per ground floor planning parking space for 245 bikes is available with 1.5m drive way. Two staircasesare provided i.e. one in front and one in back. Rampsare provided with slope of 1:10 with 1.5m width. Office space is provided for official work. Separate toilets are provided.

First floor & second floor are identical plan

The planning of parking space for 245 bikes is available with 1.5m drive way. Two staircases are provided i.e. one in front and one in back. Ramps are provided with slope of 1:10 with 1.5m width. Separate toilets are provided. Second floor is open to sky

IX. CONCLUSION

Based on the analysis it has been concluded that there is huge parking requirement near this station and there is necessity of solution that is multilevel parking.

The variation of growth of vehicular demand and population multi-storey parking lot is planned which can accommodate minimum of 1000 bikes.

Also the cost estimation of the project will be done which will help government to show interest for investment in this public help project. The invested money can be regain by charging vehicle owner for parking on time base.

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